

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

Transport Assessment (TR-001-000)

Part 7: Country assessment

Traffic and transport

November 2013

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Department
for Transport

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Contents

Part 1 - Introduction, policy, scheme description and methodology and assumptions

- Section 1: Introduction – overview of Transport Assessment
- Section 2: Policy – review of relevant policy and guidance documents
- Section 3: Scheme description – outline of Proposed Scheme
- Section 4: Methodology and assumptions – route-wide methodology and assumptions

Part 2 - Baseline conditions

- Section 5: Baseline conditions for all CFAs

Part 3 - London assessment

- Section 6a: London regional methodology
CFA1-3 construction assessment

Part 4 - London assessment

- Section 6b: CFA1-3 scheme description
CFA1-3 operational assessment

Part 5 - London assessment

- Section 6c: CFA4-6 construction and operational assessment
London region sensitivity analysis

Part 6 - Country assessment

- Section 7a: Country regional methodology
CFA7-15 construction and operational assessment

Part 7 – Country assessment

- Section 7b: CFA16-22 construction and operational assessment

Part 8 – West Midlands assessment

Section 8a: West Midlands regional methodology

CFA23-24 construction and operational assessment

Part 9 – West Midlands assessment

Section 8b: CFA25-26 construction and operational assessment

Part 10 – Route-wide and off-route assessment

Section 9: Route-wide and off-route construction and operational assessment

Part 11 – Annex A: Framework travel plan

Part 12 – Annex B(i): Baseline survey report (CFA1)

Part 13 – Annex B(ii): Baseline survey report (CFA2-6)

Part 14 – Annex B(iii): Baseline survey report (CFA7-15)

Part 15 – Annex B(iv): Baseline survey report (CFA16-22)

Part 16 – Annex B(v): Baseline survey report (CFA23-26)

Part 17 – Annex C: Model Performance reports

Part 18 – Annex D: Traffic data used for air quality assessment

Contents

Contents	i
7 Country Region	7-375
7.12 Ladbroke and Southam (CFA16)	7-375
7.13 Offchurch and Cubbington (CFA17)	7-400
7.14 Stoneleigh, Kenilworth and Burton Green (CFA18)	7-419
7.15 Coleshill Junction (CFA19)	7-451
7.16 Curdworth and Middleton (CFA20)	7-479
7.17 Drayton Bassett, Hints and Weeford (CFA21)	7-503
7.18 Whittington to Handsacre (CFA22)	7-528

List of figures

Figure 7-19: Ladbroke and Southam construction activity phasing	7-382
Figure 7-20: Offchurch and Cubbington construction activity phasing	7-405
Figure 7-21: Stoneleigh, Kenilworth and Burton Green construction activity phasing	7-427
Figure 7-22: Coleshill Junction construction activity phasing	7-457
Figure 7-23: Cudworth and Middleton construction activity phasing	7-485
Figure 7-24: Drayton Bassett, Hints and Weeford construction activity phasing	7-509
Figure 7-25: Whittington to Handsacre construction activity phasing	7-534

List of tables

Table 7-182: TEMPRO Growth Rates for 2012 (CFA16)	7-376
Table 7-183: TEMPRO Growth Rates for 2013 (CFA16)	7-377

Table 7-184: Ladbroke and Southam local road network future baseline flows (vehicles) - AM peak	7-377
Table 7-185: Ladbroke and Southam local road network future baseline flows (vehicles) - PM peak	7-378
Table 7-186: Ladbroke and Southam area future baseline performance at the A423 Southam Road/A422 Ruscote Avenue/Hennef Way roundabout	7-379
Table 7-187: Ladbroke and Southam area future baseline performance at the A422 Hennef Way/A4260 Concord Avenue roundabout	7-379
Table 7-188: Ladbroke and Southam area future baseline performance at the A422 Hennef Way/Ermont Way/Wildmere Road roundabout	7-380
Table 7-189: Ladbroke and Southam area future baseline performance at the M40 junction 11 (signalised roundabout)	7-380
Table 7-190: Ladbroke and Southam assumed workforce at construction sites	7-386
Table 7-191: Ladbroke and Southam typical vehicle trip generation for construction site compounds	7-388
Table 7-192: Ladbroke and Southam area construction traffic flows (vehicles) - AM peak	7-392
Table 7-193: Ladbroke and Southam area construction traffic flows (vehicles) - PM peak	7-392
Table 7-194: Roundabout A423 Southam Road/A422 Ruscote Avenue/Hennef Way - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-393
Table 7-195: Roundabout A422 Hennef Way/A4260 Concord Avenue - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-394
Table 7-196: Roundabout A422 Hennef Way/Ermont Way/Wildmere Road - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-394
Table 7-197: Signalised roundabout M40 Junction 11 - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-395
Table 7-198: PRow diversions in CFA16	7-397
Table 7-199: Highway realignments (CFA16)	7-398
Table 7-200: TEMPRO Growth Rates for 2012 (CFA17)	7-401
Table 7-201: TEMPRO Growth Rates for 2013 (CFA17)	7-401
Table 7-202: Offchurch and Cubbington local road network future baseline flows (vehicles) - AM peak	7-401
Table 7-203: Offchurch and Cubbington local road network future baseline flows (vehicles) - PM peak	7-402
Table 7-204: Offchurch and Cubbington area future baseline performance at the A452 Banbury Road/Warwick Bypass/Europa Way roundabout on approach to M40	7-403
Table 7-205: Offchurch and Cubbington assumed workforce at construction sites	7-407
Table 7-206: Offchurch and Cubbington typical vehicle trip generation for construction site compounds	7-408
Table 7-207: Offchurch and Cubbington area construction traffic flows (vehicles) - AM peak	7-412
Table 7-208: Offchurch and Cubbington area construction traffic flows (vehicles) - PM peak	7-413
Table 7-209: Roundabout A452 Banbury Road/Warwick Bypass/Europa Way on approach to M40 - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-414
Table 7-210: Offchurch and Cubbington PRow diversions	7-416

Table 7-211: Offchurch and Cubbington permanent highway diversions	7-417
Table 7-212: TEMPRO Growth Rates for 2012 (CFA18)	7-420
Table 7-213: TEMPRO Growth Rates for 2013 (CFA18)	7-421
Table 7-214: Stoneleigh, Kenilworth and Burton Green strategic road network future baseline flows (vehicles) - AM peak	7-421
Table 7-215: Stoneleigh, Kenilworth and Burton Green strategic road network future baseline flows (vehicles) - PM peak	7-421
Table 7-216: Stoneleigh, Kenilworth and Burton Green local road network future baseline flows (vehicles) - AM peak	7-422
Table 7-217: Stoneleigh, Kenilworth and Burton Green local road network future baseline flows (vehicles) - PM peak	7-422
Table 7-218: Stoneleigh, Kenilworth and Burton Green area future baseline performance at the A45/A452 Kenilworth Road roundabout	7-424
Table 7-219: Stoneleigh, Kenilworth and Burton Green area future baseline performance at the B4113 Stoneleigh Road/Westhill Road/Bericote Road roundabout	7-424
Table 7-220: Stoneleigh, Kenilworth and Burton Green area future baseline performance at the A452 Kenilworth Road/Bericote Road roundabout	7-425
Table 7-221: Stoneleigh, Kenilworth and Burton Green area future baseline performance at the A429 Kenilworth Road/Gibbett Road/Stoneleigh Road roundabout	7-425
Table 7-222: Stoneleigh, Kenilworth and Burton Green assumed workforce at construction sites	7-431
Table 7-223: Stoneleigh, Kenilworth and Burton Green typical vehicle trip generation for construction site compounds	7-433
Table 7-224: Stoneleigh, Kenilworth and Burton Green area construction traffic flows (vehicles) - AM peak	7-439
Table 7-225: Stoneleigh, Kenilworth and Burton Green area construction traffic flows (vehicles) - PM peak	7-439
Table 7-226: Stoneleigh, Kenilworth and Burton Green area construction traffic flows (vehicles) - AM peak	7-439
Table 7-227: Stoneleigh, Kenilworth and Burton Green area construction traffic flows (vehicles) - PM peak	7-440
Table 7-228: Priority junction A452 Kenilworth Road/B4101 Kelsey Lane - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-441
Table 7-229: Roundabout A46 Kenilworth Bypass/A452 Leamington Road - 2021 Future Baseline without and with Proposed Scheme: AM and PM	7-441
Table 7-230: Roundabout A45/A452 Kenilworth Road - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-442
Table 7-231: A445 Leicester Lane/Kenilworth Road - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-443
Table 7-232: Roundabout B4113 Stoneleigh Road/Westhill Road/Bericote Road - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-443
Table 7-233: A452 Kenilworth Road/Bericote Road - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-444
Table 7-234: Signalised junction A429 Kenilworth Road/Gibbett Hill Road/Stoneleigh Road - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-445
Table 7-235: Stoneleigh, Kenilworth and Burton Green PRoW diversions	7-447
Table 7-236: Stoneleigh, Kenilworth and Burton Green permanent highway realignments	7-449

Table 7-237: Coleshill Junction TEMPRO growth rates for 2012	7-452
Table 7-238: Coleshill Junction TEMPRO growth rates for 2013	7-452
Table 7-239: Coleshill Junction local road network future baseline flows (vehicles) - AM peak	7-453
Table 7-240: Coleshill Junction local road network future baseline flows (vehicles) - PM peak	7-453
Table 7-241: Coleshill Junction area future baseline performance at the B4118 Birmingham Road/B4118 Marsh Lane/B4117 Birmingham Road priority junction	7-454
Table 7-242: Coleshill Junction area future baseline performance at the A446 Lichfield Road/B4117 Gilson Road roundabout	7-455
Table 7-243: Coleshill Junction area future baseline performance at the Birmingham Road/B4114 Birmingham Road/A446 Stonebridge Road roundabout	7-455
Table 7-245: Coleshill Junction assumed workforce at construction sites	7-460
Table 7-246: Coleshill Junction typical vehicle trip generation for construction site compounds	7-462
Table 7-247: Coleshill Junction area construction traffic flows (vehicles) - AM peak	7-469
Table 7-248: Coleshill Junction area construction traffic flows (vehicles) - PM peak	7-469
Table 7-249: Priority junction B4118 Birmingham Road/B4118 Marsh Lane/B4117 Birmingham Road - 2021 Future Baseline without and with Proposed Scheme for AM and PM	7-470
Table 7-250: Roundabout M6/A446 Stonebridge Road - 2021 future baseline without and with Proposed Scheme for AM and PM	7-471
Table 7-251: Signalised junction A446 Lichfield Road/B5177 Watton Lane - 2021 future baseline without and with Proposed Scheme for AM and PM	7-471
Table 7-252: Roundabout A446 Lichfield Road/B4117 Gilson Road - 2021 future baseline without and with Proposed Scheme for AM and PM	7-472
Table 7-253: Roundabout Birmingham Road/B4114 Birmingham Road/A446 Stonebridge Road - 2021 future baseline without and with Proposed Scheme for AM and PM	7-473
Table 7-254: Roundabout A446 Stonebridge Road/Coleshill Heath Road - 2021 future baseline without and with Proposed Scheme for AM and PM	7-473
Table 7-255: PRoW diversion in CFA19	7-475
Table 7-256: Coleshill Junction highway realignments	7-477
Table 7-257: Curdworth and Middleton TEMPRO growth rates for 2012	7-480
Table 7-258: Curdworth and Middleton TEMPRO growth rates for 2013	7-480
Table 7-259: Curdworth and Middleton local road network future baseline flows (vehicles) - AM peak	7-481
Table 7-260: Curdworth to Middleton local road network future baseline flows (vehicles) - PM peak	7-481
Table 7-261: Curdworth and Middleton area future baseline performance at the A446 Lichfield Road/A4097 Kingsbury Road/M42 signalised roundabout	7-482
Table 7-262: Curdworth to Middleton area future baseline performance at the A4091 Tamworth Road/A446 Lichfield Road roundabout	7-483
Table 7-263: Curdworth and Middleton assumed workforce at construction sites	7-488
Table 7-264: Curdworth and Middleton typical vehicle trip generation for construction site compounds	7-490
Table 7-265: Curdworth and Middleton area construction traffic flows (vehicles) - AM peak	7-495

Table 7-266: Curdworth and Middleton area construction traffic flows (vehicles) - PM peak	7-496
Table 7-267: Roundabout A446 Lichfield Road/Faraday Avenue/Marsh Lane - 2021 future baseline without and with Proposed Scheme for AM and PM	7-497
Table 7-268: Signalised Roundabout A446 Lichfield Road/A4097 Kingsbury Road/M42 - 2021 future baseline without and with Proposed Scheme for AM and PM	7-497
Table 7-269: Roundabout A4091 Tamworth Road/A446 Lichfield Road- 2021 future baseline without and with Proposed Scheme for AM and PM	7-498
Table 7-270: PRoW diversion (CFA22)	7-500
Table 7-271: Curdworth and Middleton highway realignments (CFA16)	7-501
Table 7-272: Drayton Bassett, Hints and Weeford TEMPRO growth rates for 2012	7-504
Table 7-273: Drayton Bassett, Hints and Weeford TEMPRO growth rates for 2013	7-504
Table 7-274: Drayton Bassett, Hints and Weeford strategic road network future baseline flows (vehicles) - AM peak	7-505
Table 7-275: Drayton Bassett, Hints and Weeford strategic road network future baseline flows (vehicles) - PM peak	7-505
Table 7-276: Drayton Bassett, Hints and Weeford local road network future baseline flows (vehicles) - AM peak	7-505
Table 7-277: Drayton Bassett, Hints and Weeford local road network future baseline flows (vehicles) - PM peak	7-506
Table 7-278: Drayton Bassett, Hints and Weeford future baseline performance at the A38 London Road/A453 Tamworth Road/A446 London Road roundabout	7-507
Table 7-279: Drayton Bassett, Hints and Weeford future baseline performance at the A38 London Road/A5148/A5206 London Road roundabout	7-507
Table 7-280: Drayton Bassett, Hints and Weeford future baseline performance at the A5/A5127 Birmingham Road/A5148 (northern roundabout)	7-508
Table 7-281: Drayton Bassett, Hints and Weeford assumed workforce at construction sites	7-512
Table 7-282: Drayton Bassett, Hints and Weeford typical vehicle trip generation for construction site compounds	7-514
Table 7-283: Drayton Bassett, Hints and Weeford area construction traffic flows on strategic roads (vehicles) - AM peak	7-519
Table 7-284: Drayton Bassett, Hints and Weeford area construction traffic flows on strategic roads(vehicles) - PM peak	7-519
Table 7-285: Drayton Bassett, Hints and Weeford area construction traffic flows on local roads(vehicles) - AM peak	7-520
Table 7-286: Drayton Bassett, Hints and Weeford area construction traffic flows on local roads (vehicles) - PM peak	7-520
Table 7-287: Roundabout A38 London Road/A453 Tamworth Road/A446 London Road - 2021 future baseline without and with Proposed Scheme for AM and PM	7-521
Table 7-288: Roundabout A38 London Road/A5148/A5206 - 2021 future baseline without and with Proposed Scheme for AM and PM	7-522
Table 7-289: Roundabout A5/A5127 Birmingham Road/A5148 Exit only - 2021 future baseline without and with Proposed Scheme for AM and PM	7-522
Table 7-290: Drayton Bassett, Hints and Weeford PRoW diversion	7-524
Table 7-291: Highway diversions (CFA21)	7-526
Table 7-292: Whittington to Handsacre (CFA22) TEMPRO growth rates for 2012	7-529
Table 7-293: Whittington to Handsacre (CFA22) TEMPRO growth rates for 2013	7-529

Table 7-294: Whittington to Handsacre strategic road network future baseline flows (vehicles) - AM peak	7-530
Table 7-295: Whittington and Handsacre strategic road road network future baseline flows (vehicles) - PM peak	7-530
Table 7-296: Whittington to Handsacre local road network future baseline flows (vehicles) - AM peak	7-530
Table 7-297: Whittington and Handsacre local road network future baseline flows (vehicles) - PM peak	7-531
Table 7-298: Whittington to Handsacre area future baseline performance at the A5192 Eastern Avenue/A5127 Trent Valley Road/Cappers Lane/Valley Lane roundabout	7-533
Table 7-299: Whittington to Handsacre assumed workforce at construction sites	7-537
Table 7-300: Whittington to Handsacre typical vehicle trip generation for construction site compounds	7-539
Table 7-301: Whittington to Handsacre area construction traffic flows on strategic road (vehicles) - AM peak	7-545
Table 7-302: Whittington to Handsacre area construction traffic flows on strategic road (vehicles) - PM peak	7-545
Table 7-303: Whittington to Handsacre area construction traffic flows on local roads (vehicles) - AM peak	7-546
Table 7-304: Whittington to Handsacre area construction traffic flows on local roads (vehicles) - PM peak	7-546
Table 7-305: Roundabout A5192 Eastern Avenue/A5127 Trent Valley Road/Cappers Lane/Valley Lane - 2021 future baseline without and with Proposed Scheme for AM and PM	7-547
Table 7-306: Priority junction Cappers Lane East/A38 on Slip Road - 2021 future baseline without and with Proposed Scheme for AM and PM	7-548
Table 7-307: Whittington to Handsacre PRoW diversion	7-550
Table 7-308: Highway diversions (CFA22)	7-552

7 Country Region

7.12 Ladbroke and Southam (CFA16)

Ladbroke and Southam (CFA16) Proposed Scheme description

- 7.12.2 The Proposed Scheme through the Ladbroke and Southam area is approximately 13km in length and will commence about 500m north of the junction of a re-aligned Banbury Road with Stareton Lane, to the east of Wormleighton. The route will then proceed north-westwards, passing under Footpath SM101 (Chainage 117+275), and over Footpath SM116a (Chainage 118+000).
- 7.12.3 The route will cross over the Oxford Canal, the Salt Lane Bridleway (E2424, Chainage 119+475, minor road), a minor watercourse and Bridleway SM96 (Chainage 120+360). Crossing another minor watercourse and Footpath SM96a just to the west of Chapel Bank Cottage and Fish Ponds, the route will continue north-westwards to the west of Ladbroke Grove Farm, passing under bridges for Lower Radbourne and Ladbroke Grove Farms and over a culvert for a minor watercourse.
- 7.12.4 The route will pass to the east of Ladbroke, cutting through Windmill Hill and under a bridge for the re-aligned Windmill Lane. Then continuing in a north-west direction, the route will be aligned to the south-west of Southam, crossing under the A423 Banbury Road, over another minor watercourse, then under the B4451 Kinton Road. North of the B4451, the route will cross over the River Itchen.
- 7.12.5 The route will enter a tunnel adjacent to the Dallas Burston Polo Grounds, under the A425 Leamington Road and Long Itchington and Ufton Woods, before emerging from the tunnel approximately 10m outside of the boundary of Ufton Wood. The Proposed Scheme leaves this area as it crosses a small watercourse to the south of the Grand Union Canal.
- 7.12.6 Greatworth to Lower Boddington (CFA 15) lies to the south and Offchurch and Cubbington (CFA17) lies to the north.

Ladbroke and Southam (CFA16) assessment methodology

- 7.12.7 Within the Ladbroke and Southam area, there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore focussed on the construction stage.

Ladbroke and Southam (CFA16) future baseline

Key future baseline transport issues

- 7.12.8 The key issue in relation to the future baseline in the Ladbroke to Southam area is the change in highway network flows due to background traffic growth. Some junctions are predicted to be operating over capacity in the future baseline scenario. For assessment purposes it has been assumed that there are no material changes to the highway or public transport networks in the future baseline. It is further assumed that there are no material changes to non-motorised traffic flows.

Land use assumptions

- 7.12.9 Future developments and land use changes are accounted for within the TEMPRO growth calculations. There are no substantial committed developments in proximity to the Proposed Scheme which are considered to require specific adjustment to the TEMPRO forecasts.

Transport supply assumptions

- 7.12.10 No material changes in transport supply are anticipated. It has been assumed that bus and rail services, along with PRow usage, for future years of assessment will be the same as those currently operating. It is also assumed that no public transport or highway network improvements will be undertaken in the future baseline.

Traffic growth assumptions

- 7.12.11 The 2012/2013 baseline traffic flows of the 12 junctions, as described in the baseline conditions section for the Ladbroke and Southam area, have been uplifted to establish the future baseline conditions for 2021 by applying TEMPRO Growth Rates to existing traffic flows.
- 7.12.12 The TEMPRO Growth rates applied in this area can be found Table 7-182 and Table 7-183.

Table 7-182: TEMPRO Growth Rates for 2012 (CFA16)

Authority	Location	Zone	2012-2021	
			Average Weekday Peaks	
			AM	PM
Warwickshire	Stratford-on-Avon	Rural	1.07	1.08
Warwickshire	Stratford-on-Avon	Southam	1.07	1.07
Oxfordshire	Cherwell	Banbury	1.12	1.12

Table 7-183: TEMPRO Growth Rates for 2013 (CFA16)

Authority	Location	Zone	2013-2021	
			Average Weekday Peaks	
			AM	PM
Warwickshire	Stratford-on-Avon	Rural	1.07	1.08
Warwickshire	Stratford-on-Avon	Southam	1.07	1.07
Oxfordshire	Cherwell	Banbury	1.11	1.11

- 7.12.13 The factors have been derived for the individual road types and relevant wards. The assessment covers the AM and PM peak periods for an average weekday.

Strategic and local road network traffic flows

- 7.12.14 There are no strategic roads that pass through the Ladbroke and Southam area.

- The directional future baseline traffic flows for local roads in the area which are likely to be affected by traffic changes as a result of the construction of the Proposed Scheme are contained within Table 7-184 and Table 7-185.

Table 7-184: Ladbroke and Southam local road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A423 Banbury Road, between Banbury and Wormleighton Road	NB	297	33	332	37	35	12%
	SB	596	46	665	51	69	12%
A423 Banbury Road, between Southam and Ladbroke	NB	284	29	305	31	21	7%
	SB	316	34	340	37	24	7%
A425 Leamington Road, between jnc with B4452 and jnc with B4451	NB	602	45	647	48	45	7%
	SB	355	39	381	42	26	7%

Table 7-185: Ladbroke and Southam local road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A423 Banbury Road, between Banbury and Wormleighton Road	NB	594	32	665	36	71	12%
	SB	342	19	383	21	41	12%
A423 Banbury Road, between Southam and Ladbroke	NB	346	28	373	30	27	8%
	SB	289	17	312	18	23	8%
A425 Leamington Road, between jnc with B4452 and jnc with B4451	NB	422	26	456	28	34	8%
	SB	544	21	587	23	43	8%

7.12.15 In addition to the links described in the tables above, the following will also be affected by the construction of the Proposed Scheme as a result of traffic flow increases due to construction and mass haul movements. These links are as follows:

- Welsh Road east from A425 Daventry Road to Holt Road.
- A423 Southam Bypass between Banbury Road and Daventry Road.

Junction performance

7.12.16 A total of twelve junctions within the Ladbroke and Southam area have been identified as having potential to be impacted by additional traffic as generated by the construction movements of the Proposed Scheme. These junctions are as follows:

- A425 Leamington Road/A423 Banbury Road;
- A425 Daventry Road/A423 Banbury Road;
- A425 Daventry Road/Welsh Road east
- A423 Banbury Road/Glebe Farm Access;
- A423 Southam Road/Dukes Meadow Drive/Noral Way;
- A423 Southam Road/A422 Ruscote Avenue/Hennef Way;
- A422 Hennef Way/A4260 Concord Avenue;
- A422 Hennef Way/Ermont Way/Wildmere Road;
- M40 Junction 11;
- A425 Leamington Road/B4452;

- A425 Leamington Road/B4451 Kineton Road and
- A425 Southam Road/B4455 Fosse Way.

7.12.17 Existing traffic flows, through the junctions have been uplifted to establish their future baseline flows to compare with capacities. Table 7-186 to Table 7-189 show the junctions which will operate with flow/capacity values over 85% on one arm or more in the future baseline scenario. The 85% ratio is considered to be the threshold above which the junction is approaching its practical traffic capacity. It should be noted that once the junction reaches capacity (100%), then the predicted queue lengths become less reliable as the modelling software is approaching the limits of its operating range.

Table 7-186: Ladbroke and Southam area future baseline performance at the A423 Southam Road/A422 Ruscote Avenue/Hennef Way roundabout

08:00-09:00	2013			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A423 Southam Road	836	49%	1	926	57%	1
A422 Hennef Way	1360	67%	2	1508	76%	3
A361 Southam Road	543	41%	1	602	48%	1
A422 Ruscote Avenue	892	53%	1	989	61%	2
17:00-18:00	2013			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A423 Southam Road	770	48%	1	856	55%	1
A422 Hennef Way	1492	76%	3	1660	86%	6
A361 Southam Road	714	62%	2	794	76%	3
A422 Ruscote Avenue	907	56%	1	1009	65%	2

Table 7-187: Ladbroke and Southam area future baseline performance at the A422Hennef Way/A4260 Concord Avenue roundabout

08:00-09:00	2013			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Unclassified Road	30	8%	0	34	14%	0
A422 Hennef Way (E)	2221	75%	3	2463	84%	5
A4260	665	43%	1	738	51%	1
A422 Hennef Way (W)	1631	76%	3	1809	86%	6

17:00-18:00	2013			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Unclassified Road	30	6%	0	33	8%	0
A422 Hennef Way (E)	1771	59%	1	1969	66%	2
A4260	911	56%	1	1012	66%	2
A422 Hennef Way (W)	1119	55%	1	1245	63%	2

Table 7-188: Ladbroke and Southam area future baseline performance at the A422 Hennef Way/Ermont Way/Wildmere Road roundabout

08:00-09:00	2013			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Wildmere Road	169	14%	0	188	17%	0
A422 Hennef Way (E)	2660	100%	39	2949	112%	182
Ermont Way	744	97%	14	825	109%	43
A422 Hennef Way (W)	1999	75%	3	2217	83%	5
17:00-18:00	2013			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Wildmere Road	733	67%	2	815	84%	5
A422 Hennef Way (E)	1788	73%	3	1988	82%	5
Ermont Way	908	77%	3	1010	94%	11
A422 Hennef Way (W)	1553	55%	1	1726	62%	2

Table 7-189: Ladbroke and Southam area future baseline performance at the M40 junction 11 (signalised roundabout)

08:00-09:00	2013			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
M40 (N)	693	66%	5	768	70%	6
A361 Williamscot Hill	619	61%	3	686	85%	4
A422 (E)	1435	90%	15	1592	92%	15
M40 (S)	614	103%	15	680	94%	10
A422 Hennef Way (W)	869	55%	3	963	62%	1
17:00-18:00	2013			2021		

Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
M40 (N)	515	64	4	573	76%	5
A361 Williamscot Hill	355	41	3	394	59%	1
A422 (E)	908	56	6	1011	58%	6
M40 (S)	773	64	5	859	79%	7
A422 Hennef Way (W)	1917	82	5	2133	93%	6

Ladbroke and Southam (CFA16) Proposed Scheme construction description

Construction activities

- 7.12.18 The main construction elements within the study area are as follows:
- Boddington, Ladbroke and Southam Cuttings, and Oxford Canal Embankment;
 - Long Itchington Wood Green Tunnel; and
 - Long Itchington Wood Tunnel.
- 7.12.19 Details of the construction phasing are summarised in Figure 7-19.

[illegible]

[illegible]

Long Itchington Wood south portal installation											
Long Itchington Wood north portal installation											
Commissioning											
Key:											



Construction works



Compound duration

Compounds and construction sites

- 7.12.20 Within the Ladbroke and Southam area a total of two main and 14 satellite construction compounds will be situated along the alignment of the Proposed Scheme. In addition to these there will be one Road head within this area, used as an access point on to the highway network for the movement excavated material.
- 7.12.21 The forecast size of the construction workforce required for each construction compound has been estimated from the construction activities associated with the design elements assigned to each compound. The peak and average daily workforce for each compound is shown in Table 7-190. Compounds with no workforce numbers are accessed via other compounds; where numbers are given they include all workers utilising that compound.
- 7.12.22 The location of the construction compounds are shown on Map CT-05-079b to CT-05-088a (Volume 2, Map Book 16).

Table 7-190: Ladbroke and Southam assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		average	peak
Main	Oxford Canal North Embankment Main Compound	82	166
Main	Long Itchington Wood Tunnel Main Compound	98	120
Satellite	Footpath SM101 Green Overbridge Compound	-	-
Satellite	Footpath SM116A Underpass Compound	-	-
Satellite	Oxford Canal Compound	-	-
Satellite	Lower Radbourne South Viaduct Compound	-	-
Satellite	Lower Radbourne North Viaduct Compound	-	-
Satellite	Lower Radbourne Farm Accommodation Overbridge Compound	29	40
Satellite	Ladbroke Grove Farm Accommodation Overbridge Compound	-	-
Satellite	A423 Banbury Road Overbridge (North) Compound	37	40
Satellite	A423 Banbury Road Overbridge (South) Compound	-	-

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
Satellite	Windmill Lane Farm Overbridge Compound	28	40
Satellite	B4451 Kineton Road Overbridge Compound	37	40
Satellite	River Itchen Viaduct Compound	46	56
Satellite	Long Itchington Wood Green Tunnel Compound	69	84
Satellite	Longhole Viaduct (South) Compound	-	-

Construction trip assumptions

Trip generation

- 7.12.23 Construction vehicle movements required to construct the Proposed Scheme include the delivery of plant and materials, movement of excavated materials and site worker trips to and from construction compounds. Construction routes have been determined based on the best available highway corridors between compounds and the strategic highway network with the aim of minimising impacts on local roads where practicable.
- 7.12.24 The duration of when there will be busy transport activity at each site is shown in Table 7-191. Some compounds only have traffic movements to other locations within the construction area. The data in Table 7-191 represent the periods when the construction traffic flows will be greater than 50% of the peak flows. Also shown is the estimated number of daily vehicle trips during the peak month of activity, the lower end of the range shows the average number of trips in the busy period and the upper end the peak month flows. The assessment scenario has assumed that the peak month of operation for each site occur at the same time, therefore the assessment is based on a worst case scenario.

Table 7-191: Ladbroke and Southam typical vehicle trip generation for construction site compounds

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Main	Oxford Canal north embankment main compound	Glebe Farm access road, A423 Banbury Road / Southam Road, A422 Hennef Way	2018	5	39	160-245	40-60
Main	Long Itchington Wood tunnel main compound	Welsh Road, B4455 Fosse Way, B4100 Banbury Road, A452 Warwick Bypass	2019	3.5	48	150-180	55-60
Satellite	Footpath SM101 green overbridge compound	Track/haul road via Oxford Canal north embankment main compound	2018	1.5	-	Few external movements	
Satellite	Footpath SM116A underpass compound	Track/haul road via Oxford Canal north embankment main compound	2019	1	-	Few external movements	
Satellite	Oxford Canal viaduct compound	Track/haul road via Oxford Canal north embankment main compound	2019	1.5	-	Few external movements	
Satellite	Lower Radbourne south viaduct compound	Track/haul road via Oxford Canal north embankment main compound	2018	2	-	Few external movements	
Satellite	Lower Radbourne north viaduct compound	Track/haul road via Oxford Canal north embankment main compound	2017	1	-	Few external movements	
Satellite	Lower Radbourne Farm accommodation overbridge compound	Welsh Road East via Paxhall Farm access, then A425 Daventry Road, A423 Banbury Road/Southam Road	2018	2.5	21	50-65	25-30
Satellite	Ladbroke Grove Farm accommodation overbridge compound	Track/haul route via Lower Radbourne Farm accommodation overbridge compound	2018	1	-	Few external movements	
Satellite	A423 Banbury Road overbridge (north) compound	A423 Banbury Road	2018	1	11	60-65	15-20

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	A423 Banbury Road overbridge (south) compound	Track/haul route via A423 Banbury Road overbridge (north) compound	2018	1	-	Few external movements	
Satellite	Windmill Lane Farm overbridge compound	Windmill Lane, A423 Banbury Road/Southam Road	2018	4	25	50-65	25-30
Satellite	B4451 Kineton Road overbridge compound	B4451 Kineton Road, A425 Leamington Road, A423 Banbury Road/Southam Road	2018	1	12	60-65	20
Satellite	River Itchen viaduct compound	A425 Leamington Road, A423 Banbury Road/Southam Road	2019	3	34	75-85	-25-30
Satellite	Long Itchington Wood green tunnel compound	A425 Leamington Road, A423 Banbury Road/Southam Road	2018	2.5	27	105-125	30
Satellite	Longhole viaduct (south) Compound	Track/haul route via Long Itchington Wood tunnel main compound	2018	1	-	Few external movements	
Road head	RH-126	A425 Leamington Road, B4455 Fosse Way, B4100 Banbury Road, A452 Warwick Bypass	2019	2	23	-	234

7.12.25 Trip generation from the construction works being undertaken in neighbouring CFAs has also been included in this assessment. Construction traffic flows of 560 cars/LGV and 170 HGV per day inbound and 490 cars/LGV and 170 HGV per day outbound via the A423 Banbury Road as generated from CFA15 (Greatworth to Lower Boddington) and 250 cars/LGV and 210 HGV per day inbound and 260 cars/LGV and 210 HGV per day outbound via the A425 Leamington Road as generated from CFA17 (Offchurch and Cubbington) in the adjacent CFAs have been included in the assessment for this area.

Construction lorry routes

7.12.26 Construction trips will mainly occur along the alignment of the Proposed Scheme, however the main construction routes through the area will be as follows:

- A423 Banbury Road, between Banbury in the south and its junction with the A425 Daventry Road in the north, and
- A425 Leamington Road, between its junction with the A423 Banbury Road in the east and the boundary with the neighbouring Offchurch to Cubbington area (CFA17).

7.12.27 The construction routes can be found on Map TR-03-101.

Traffic management, road closures and diversions

7.12.28 There are no highways in this area which will be subject to substantial traffic management measures during the construction of the Proposed Scheme.

7.12.29 Overnight and/or weekend closures will be required to tie-in new highway diversions of the Proposed Scheme with the existing highways. These temporary closures will occur on the following highways:

- Wormleighton Road, to the west of its junction with Stareton Lane;
- Stoneton Lane, at its junction with Wormleighton Road;
- Windmill Lane, to the east of the A423 Banbury Road;
- A423 Banbury Road, at Starbold Farm;
- B4451 Kineton Road, at the Fields House; and
- A425 Leamington Road, opposite the Dallas Burston Polo Grounds.

PRoW closures and diversions

7.12.30 In this area no PRoW will be closed during the construction phase of the Proposed Scheme, however one PRoW, SM101 (Chainage 117+275), will be subject to an approximately 250m diversion.

Avoidance and mitigation

7.12.31 The following measures have been included as part of the engineering design of the Proposed Scheme in this area and will avoid or reduce impacts on transport users:

- construction materials and equipment will be transported along the haul road adjacent to the Proposed Scheme alignment where reasonably practicable, to reduce lorry movements on the public highway;
- the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in limited diversions of traffic onto alternative routes;
- the Proposed Scheme includes permanent realignments of 10 PRoW and two E-roads and temporary re-routing as necessary to reduce loss of amenity;
- road closures will be limited to overnight and/or weekends;
- HGV routing along the strategic road network and using designated routes

for access as shown on Map TR-03-101 (Volume 5, Map Book, Traffic and Transport);

- materials will be transported by rail, where practicable, to reduce the potential numbers of HGV trips that would otherwise be made on the highway network; and
- provision of on-site accommodation and welfare facilities to reduce daily travel by site workers.

7.12.32 The draft Code of Construction Practice (CoCP) (see Volume 5: Appendix CT-003-000) includes measures that seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

7.12.33 Where reasonably practicable, the number of private car trips to and from each site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an over-arching framework travel plan¹ that will require travel plans to be used along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where practicable, particularly in a rural context, this will encourage the use of sustainable modes of transport.

7.12.34 The measures in the CoCP will include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific traffic management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, footpaths and other PRow affected by the Proposed Scheme as necessary.

7.12.35 Specific measures will include:

- core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will therefore generally arrive before the AM peak hour and depart after the PM peak hour (although the assessment has assumed that some of work journeys to the construction sites take place within the AM and PM peak hours to reflect a reasonable worst case scenario) (draft CoCP, Section 5);
- sites associated with tunnelling works (Long Itchington Wood Tunnel Main Compound) will be operational 24 hours a day, it is envisaged that the shift

¹ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

changeover times will not coincide with the highway peak hours; and

- excavated material will be reused wherever reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15).

Ladbroke and Southam (CFA16) construction impacts

Key construction transport issues

- 7.12.36 This section considers the key transport issues during construction including impacts upon the road network, on road safety, upon public transport users and non-motorised users of the transport network.

Strategic and local road network traffic flows

- 7.12.37 There are no strategic roads that pass through the Ladbroke and Southam area.
- 7.12.38 Construction of the Proposed Scheme is forecast to result in substantial increases in daily traffic flows on certain roads within the Ladbroke and Southam area as a result of designated construction routes through the area. The links expected to be impacted are summarised in Table 7-192 and Table 7-193.

Table 7-192: Ladbroke and Southam area construction traffic flows (vehicles) - AM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A423 Banbury Road, between Banbury and Wormleighton Road	NB	297	332	564	64	232	27	70%	73%
	SB	594	665	697	76	32	25	5%	49%
A423 Banbury Road, between Southam and Ladbroke	NB	284	305	465	51	160	20	52%	65%
	SB	316	340	364	55	24	18	7%	49%
A425 Leamington Road, between jnc with B4452 and jnc with B4451	NB	602	647	715	58	68	10	11%	21%
	SB	355	381	392	52	11	10	3%	24%

Table 7-193: Ladbroke and Southam area construction traffic flows (vehicles) - PM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A423 Banbury Road, between Banbury and Wormleighton Road	NB	594	665	677	44	12	8	2%	22%
	SB	342	383	582	30	199	9	52%	43%

A423 Banbury Road, between Southam and Ladbroke	NB	346	373	382	36	9	6	2%	20%
	SB	289	312	448	25	136	7	44%	39%
A425 Leamington Road, between jnc with B4452 and jnc with B4451	NB	422	456	460	31	4	3	1%	11%
	SB	544	587	643	27	56	4	10%	17%

7.12.39 Capacities of single carriageway roads depend upon their geometry but a value of 1600 vehicles per hour per lane is specified within the Department for Transport's DMRB Volume 13. In this regard all the links assessed in the above table have forecasted traffic flows, including construction traffic, well within the link capacity for a single carriageway road.

7.12.40 In addition to the links identified above, the eastern section of Welsh Road between A425 Daventry Road and Holt Road will be subject to small amounts of construction traffic. These flows are forecast to be up to 18 vehicle movements per hour including 4 HGVs and will not materially affect capacity. Construction flows on the A423 Southam Bypass between Banbury Road and Daventry Road are expected to be up to 170 vehicles per hour including 36 HGVs. Again this quantum of construction traffic is not expected to substantially impact on capacity or congestion.

Junction performance

7.12.41 Junctions within this area have been assessed for the future baseline with construction traffic generated by the Proposed Scheme. Eight of the twelve junctions are expected to operate within capacity when adding construction traffic to the 2021 future baseline scenario. The results of the junctions which are predicted to have flow/capacity values over 85% are presented in Table 7-194 to Table 7-197.

Table 7-194: Roundabout A423 Southam Road/A422 Ruscote Avenue/Hennef Way - 2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00		2021 baseline			2021 With HS2 construction traffic		
Approach (from)		Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A423 Southam Road		926	57%	1	983	60%	2
A422 Hennef Way		1508	76%	3	1767	89%	7
A361 Southam Road		602	48%	1	602	55%	1
A422 Ruscote Avenue		989	61%	2	989	67%	2
17:00-18:00		2021 baseline			2021 With HS2 construction traffic		
Approach (from)		Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A423 Southam Road		856	55%	1	1064	69%	2

A422 Hennef Way	1660	86%	6	1680	87%	6
A361 Southam Road	794	76%	3	794	77%	3
A422 Ruscote Avenue	1009	65%	2	1009	65%	2

- 7.12.42 The modelling results demonstrate that the Proposed Scheme has a minimal impact on the capacity of the A423 Southam Road/A422 Ruscote Avenue/Hennef Way junction.

Table 7-195: Roundabout A422 Hennef Way/A4260 Concord Avenue - 2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
Unclassified Road	34	14%	0	34	16%	0
A422 Hennef Way (E)	2463	84%	5	2722	93%	12
A4260	738	51%	1	738	59%	1
A422 Hennef Way (W)	1809	86%	6	1867	89%	8
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Unclassified Road	33	8%	0	33	10%	0
A422 Hennef Way (E)	1969	66%	2	1990	66%	2
A4260	1012	66%	2	1012	67%	2
A422 Hennef Way (W)	1245	63%	2	1453	74%	3

- 7.12.43 The modelling results demonstrate that the A422 Hennef Way/A4260 Concord Avenue junction will be approaching its theoretical capacity during the AM peak in 2021. However, the impact of the Proposed Scheme is not substantial.

Table 7-196: Roundabout A422 Hennef Way/Ermont Way/Wildmere Road - 2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
Wildmere Road	188	17%	0	188	18%	0
A422 Hennef Way (E)	2949	112%	182	3207	122%	324
Ermont Way	825	109%	43	825	112%	53
A422 Hennef Way (W)	2217	83%	5	2274	85%	5
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		

Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Wildmere Road	815	84%	5	815	97%	15
A422 Hennef Way (E)	1988	82%	5	2008	83%	5
Ermont Way	1010	94%	11	1010	95%	12
A422 Hennef Way (W)	1726	62%	2	1934	69%	2

- 7.12.44 The modelling results demonstrate that the A422 Hennef Way/Ermont Way/Wildmere Road junction is predicted to be operating over capacity in the AM peak in the 2021 baseline scenario. However the queues reported are likely to be overestimated as the analysis assumes background traffic growth is unconstrained, which is unlikely to be the case on a congested highway network. Construction traffic will increase queues and delays at the junction but the overall impact on congestion is unlikely to be major due to the over estimating of congestion impacts in the future baseline. .

Table 7-197: Signalised roundabout M40 Junction 11 - 2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
M40 (N)	768	70%	6	884	76%	7
A361 Williamscot Hill	686	85%	4	686	97%	9
A422 (E)	1592	92%	15	1592	99%	23
M40 (S)	680	94%	10	796	105%	22
A422 Hennef Way (W)	963	62%	1	995	64%	1
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
M40 (N)	573	76%	5	579	88%	8
A361 Williamscot Hill	394	59%	1	394	64%	2
A422 (E)	1011	58%	6	1011	59%	8
M40 (S)	859	79%	7	865	77%	9
A422 Hennef Way (W)	2133	93%	6	2333	90%	5

- 7.12.45 The modelling results demonstrate that the M40 Junction 11 will be operating at capacity in the 2021 future baseline scenario. However, the impact of the Proposed Scheme is not substantial.

- 7.12.46 In addition to the junctions identified above, the junction between Welsh Road and A425 Daventry Road will be subject to small amounts of construction traffic. These flows are forecast to be up to 18 vehicle movements per hour including 4 HGVs and will not materially affect the capacity of the junction. The junction between the A425 Leamington Road/B4451 Kineton Road will be subject to construction flows of up to 200 vehicles per hour including up to 36 HGVs. Again this quantum of construction traffic is not expected to lead to substantial impacts in terms of the capacity of the junction or congestion impacts.
- 7.12.47 Overnight and/or weekend road closures will be required to tie-in new highway realignments the existing highways. These temporary closures will occur on the following highways:
- Wormleighton Road, to the west of its junction with Stareton Lane;
 - Stoneton Lane, at its junction with Wormleighton Road;
 - Windmill Lane, to the east of the A423 Banbury Road;
 - A423 Banbury Road, at Starbold Farm;
 - B4451 Kineton Road, at the Fields House; and
 - A425 Leamington Road, opposite the Dallas Burston Polo Grounds.
- 7.12.48 These off peak closures will not have a substantial impact on road users.
- 7.12.49 Highway realignments in this area will result in changes in journey length. These changes will be permanent and are reported later in Proposed Scheme operation
- 7.12.50 In order to access the Oxford Canal north embankment main compound the existing access from the A423 Banbury Road to the two farms and beyond will require to be upgraded to a suitable carriageway construction. These works will not cause substantial highway impacts.

Accidents and safety

- 7.12.51 No substantial accident clusters have been identified on routes used by construction traffic of the Proposed Scheme within Ladbroke and Southam; construction traffic is not expected to substantially affect accident rates.

Rail

- 7.12.52 There are no existing rail services in the area which could be affected by the construction of the Proposed Scheme.

Local bus and coach

- 7.12.53 It is not expected that the construction of the Proposed Scheme will require any bus route diversions, as road closures are only proposed overnight when bus services will not be operational.

Pedestrians, cyclists and equestrians

- 7.12.54 The main issues anticipated to arise as a result of the construction of the Proposed Scheme within the Ladbroke and Southam area will be temporary diversions of PRow.
- 7.12.55 A total of 10 PRow and two E roads will be permanently realigned in this area and are discussed in the operation section. Two of the 10 affected PRow will be temporarily diverted during the construction phase of the Proposed Scheme. Table 7-198 lists the PRow subject to a temporary realignment, their diversion lengths and increase in journey times.

Table 7-198: PRow diversions in CFA16

PRow	Chainage	Diversion Length	Journey time increase
SM101	117+275	250m	3min
SM200	118+670	25m	Less than 1min

- 7.12.56 The above diversions will be of a minor length and affect low numbers of users (less than 10 users per day). Therefore it is considered that these changes will not adversely impact non-motorised users.
- 7.12.57 Note that impacts arising from permanent PRow realignments are reported in the operations section below.

Waterways and canals

- 7.12.58 There is one navigable waterway, Oxford Canal, within the Ladbroke and Southam area. The impact of the construction of the Proposed Scheme on the Oxford Canal is anticipated to be minimal since no stoppage of the waterway is proposed.

Ladbroke and Southam (CFA16) Proposed Scheme operation description

Operation trip assumptions

Trip generation

- 7.12.59 During the operational phase of the Proposed Scheme only occasional trips will have to be made for maintenance purposes. These infrequent vehicle movements will be very low and will have no material impact on the operation of any junctions or highways within the study area.

Avoidance and mitigation measures

- 7.12.60 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads crossing the Proposed Scheme in, or very close to their current location, resulting in no lengthy diversions of traffic onto

alternative routes; and

- retaining PRow crossing the Proposed Scheme, with any realignments kept to a minimum where reasonably practicable.

Ladbroke and Southam (CFA16) operation impacts

Key operation transport issues

7.12.61 This section considers the key transport issues during operations including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.

7.12.62 As previously set out, within Ladbroke and Southam, there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore not considered further in this section.

Road network traffic flows

7.12.63 This section considers the impacts on traffic and transport and the consequential impacts resulting from the operational phase of the Proposed Scheme.

7.12.64 There are no strategic roads that pass through the Ladbroke and Southam area.

7.12.65 A total of six roads will be realigned within this area. Table 7-199 illustrates the change in length of each highway. Negative values demonstrate a shortening of the highway compared to its original alignment.

Table 7-199: Highway realignments (CFA16)

Highway	Change in Length
Stoneton Lane	320m
Wormleighton Road	630m
Windmill Lane	90m
A423 Banbury Road	-10m
B4451 Kineton Road	-20m
A425 Leamington Road	350m

7.12.66 The maximum increase in journey length of 630m equates to a journey time of approximately 8 minutes for pedestrians and significantly less for motorised traffic. This level of change will not substantially impact on transport users within this area.

7.12.67 Overall, average travel times and journey time delays for vehicles through the area will also be similar to those forecasted without the Proposed Scheme in both 2026 and 2041.

Accidents and safety

- 7.12.68 The impacts on accidents and safety will be negligible as there are no locations where there are existing highway safety issues or any material increases in traffic due to the operation of the Proposed Scheme.

Rail

- 7.12.69 Since there are no existing national or local rail services situated within this area, the Proposed Scheme will not impact on any rail services.

Local bus and coach

- 7.12.70 The Proposed Scheme will have no substantial impact on bus services which will cross the alignment of the Proposed Scheme. Bus services using Kineton Road will be subject to a 20m reduction in journey length whereas those using Leamington Road will experience a 350m increase. Changes of this magnitude will not materially affect overall journey times or delays for public transport users.

Pedestrians, cyclists and equestrians

- 7.12.71 A total of 10 PRoW and two E-roads will be realigned within this area. Of these, six PRoW and one E-road will be realigned by less than 100m. The Proposed Scheme will impact on four PRoW (SM116a, Chainage 118+000; SM96, 120+360; SM90, 123+090 and SM33, 124+770) and one E-road (E2413, 120+950). The maximum realignment in this area will be approximately 845m (SM96). During surveys undertaken no users utilised this PRoW.
- 7.12.72 Therefore it is considered that these changes will not substantially adversely impact existing pedestrians, cyclist or equestrians.

Waterways and canals

- 7.12.73 The operation of the Proposed Scheme will have no substantial impact on the Oxford Canal within this area.

7.13 Offchurch and Cubbington (CFA17)

Offchurch and Cubbington (CFA17) Proposed Scheme description

- 7.13.2 The Offchurch and Cubbington CFA covers a 7.25km section of the Proposed Scheme in Warwick District, where it passes to the east of Royal Leamington Spa. It extends from the Grand Union Canal in the south to the boundary between Weston-under-Wetherley and Stoneleigh parishes in the north. The area includes land within the parishes of Offchurch, Cubbington and Weston-under-Wetherley.
- 7.13.3 The area sits between the adjacent CFAs of Ladbroke and Southam (CFA16) to the south and Stoneleigh, Kenilworth and Burton Green (CFA18) to the north.

Offchurch and Cubbington (CFA17) assessment methodology

- 7.13.4 Within the Offchurch and Cubbington area, there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore focussed on the construction stage.

Offchurch and Cubbington (CFA17) future baseline

Key future baseline transport issues

- 7.13.5 The key issue in relation to the future baseline in the Offchurch to Cubbington area is the change in highway network flows due to background traffic growth. Some junctions are predicted to be operating over capacity in the future baseline scenario. For assessment purposes it has been assumed that there are no material changes to the highway or public transport networks in the future baseline. It is further assumed that there are no material changes to non-motorised traffic flows.

Land use assumptions

- 7.13.6 Future developments and land use changes are accounted for within the TEMPRO growth calculations. There are no substantial committed developments in proximity to the Proposed Scheme which are considered to require specific adjustment to the TEMPRO forecasts.

Transport supply assumptions

- 7.13.7 No material changes in transport supply are anticipated. It has been assumed that bus and rail services, along with PRow usage, for future years of assessment will be the same as those currently operating. It is also assumed that no public transport or highway network improvements will be undertaken in the future baseline.

Traffic growth assumptions

- 7.13.8 The baseline traffic flows of two junctions, as described in the baseline conditions section for the Offchurch and Cubbington area, have been uplifted to establish the future baseline conditions for 2021 by applying TEMPRO Growth Rates to existing traffic flows.

7.13.9 The TEMPRO Growth rates applied in this area can be found in Table 7-200 and Table 7-201.

Table 7-200: TEMPRO Growth Rates for 2012 (CFA17)

Authority	Location	Zone	2012-2021	
			Average Weekday Peaks	
			AM	PM
Warwickshire	Warwick	Rural	1.1	1.1

Table 7-201: TEMPRO Growth Rates for 2013 (CFA17)

Authority	Location	Zone	2013-2021	
			Average Weekday Peaks	
			AM	PM
Warwickshire	Warwick	Rural	1.1	1.09

7.13.10 The factors have been derived for the individual road types and relevant wards. The assessment covers the AM and PM peak periods for an average weekday.

Strategic and local road network traffic flows

7.13.11 There are no strategic routes that pass through the area.

7.13.12 The directional future baseline traffic flows for local roads in the area which are likely to be affected by traffic changes as a result of the construction of the Proposed Scheme are contained within Table 7-202 and Table 7-203.

Table 7-202: Offchurch and Cubbington local road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021			
		All vehicles	HGV	All vehicles	HGV	2021	2021
Welsh Road, between the Grand Union canal and the B4455 Fosse Way	NB	74	2	81	2	7	10%
	SB	52	2	57	2	5	10%
Welsh Road, between the B4455 Fosse Way and Hunningham Road	EB	150	8	164	9	14	10%
	WB	145	7	159	8	14	10%
B4455 Fosse Way, between appr 170m north of Long Itchington Road and Welsh Road	NB	205	20	225	22	20	10%
	SB	505	25	553	27	48	10%
Hunningham Road, between Welsh	NB	2	0	2	0	0	10%

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
Road and Fields Farm Cottages access track	SB	8	0	9	0	1	10%

Table 7-203: Offchurch and Cubbington local road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
Welsh Road, between the Grand Union canal and the B4455 Fosse Way	NB	46	2	50	2	4	10%
	SB	65	2	71	2	6	10%
Welsh Road, between the B4455 Fosse Way and Hunningham Road	EB	132	5	145	5	13	10%
	WB	170	8	186	9	16	10%
B4455 Fosse Way, between appr 170m north of Long Itchington Road and Welsh Road	NB	548	17	600	19	52	10%
	SB	221	12	242	13	21	10%
Hunningham Road, between Welsh Road and Fields Farm Cottages access track	NB	14	1	15	1	1	10%
	SB	9	0	10	0	1	10%

7.13.13 In addition to the links described in the tables above, the following will also be affected by the construction of the Proposed Scheme as a result of traffic flow increases due to construction and mass haul movements. These links are as follows:

- B4455 Fosse Way, between Welsh Road and B4100 Banbury Road
- B4453 Rugby Road
- Coventry Road north of B4453
- Kenilworth Road west of Rugby Road
- B4100 Banbury Road between Fosse Way and the A452
- West Hill Road between A445 Leicester Lane and B4113 Stoneleigh Road

7.13.14 The junctions within the Offchurch and Cubbington area which have been identified as having potential to be impacted by additional traffic as generated by the construction movements of the Proposed Scheme are as follows:

- B4455 Fosse Way/Welsh Road;
- A452 Banbury Road/Warwick Bypass/Europa Way;
- Welsh Road/Long Itchington Road; and
- B4455 Fosse Way/Long Itchington Road.
- B4453 Rugby Road/Coventry Road; and
- B4453 Rugby Road/Kenilworth Road

7.13.15 Existing traffic flows, through the junctions, have been uplifted to establish their future baseline flows to compare with capacities. Table 7-204 shows the junction which will operate with a flow/capacity value over 85% on one arm in the future baseline scenario. The 85% ratio is considered to be the threshold above which the junction is approaching its practical traffic capacity. It should be noted that once the junction reaches capacity (100%), then the predicted queue lengths become less reliable as the modelling software is approaching the limits of its operating range.

Table 7-204: Offchurch and Cubbington area future baseline performance at the A452 Banbury Road/Warwick Bypass/Europa Way roundabout on approach to M40

08:00-09:00	2013			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A425 (N) South Bound	214	15%	0	234	18%	0
A452 Europa Way(W) East Bound	1025	74%	3	1123	82%	4
Banbury Road (S) North Bound	798	62%	2	874	71%	2
Warwick-By-Pass(E) West Bound	1132	81%	4	1240	91%	8
17:00-18:00	2013			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A425 (N) South Bound	244	25%	0	440	28%	0
A452 Europa Way(W) East Bound	51	70%	2	1237	78%	4
Banbury Road (S) North Bound	622	58%	1	824	66%	2

Warwick-By-Pass(E) West Bound	145	53%	1	964	59%	1
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Offchurch and Cubbington (CFA17) Proposed Scheme construction description

Construction activities

- 7.13.16 The main construction elements within the study area will be as follows:
- Cubbington retaining wall;
 - Offchurch Cutting, and Grand Union and River Leam Embankments; and
 - B4455 Fosse Way Overbridge.
- 7.13.17 Details of the construction phasing are summarised in Figure 7-20.

Figure 7-20: Offchurch and Cubbington construction activity phasing

Construction activity	2017				2018				2019				2020				2021				2022				2023				2024				2025			
	quarters				quarters				quarters				quarters				quarters				quarters				quarters				quarters							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Advance works																																				
Advance works																																				
Civil engineering works																																				
Long Itchington Wood main compound (see CFA16																																				
Satellite compounds:																																				
Longhole viaduct (north)																																				
Fosse Way main compound																																				
Grand Union embankment																																				
Offchurch cutting																																				
Ash Beds embankment																																				
Ash Beds cutting																																				
River Leam embankment																																				
Lower Grange embankment																																				
Lower Grange cutting																																				
Cubbington cutting																																				
Satellite compounds:																																				
Welsh Road underbridge																																				
Hunningham Road overbridge																																				
River Leam viaduct																																				
Cubbington retaining wall																																				
Coventry Road overbridge																																				

Volume 5 Appendix - Transport Assessment - TR-001-000 | Country assessment (CFA 17)

Construction activity	2017 quarters	2018 quarters	2019 quarters	2020 quarters	2021 quarters	2022 quarters	2023 quarters	2024 quarters	2025 quarters
Rail infrastructure systems works									
<i>Kingsbury Road railhead main compound (see</i>									
Rail installation works									
<i>A423 Banbury Road main compound (see CFA16</i>									
Satellite compound:									
Offchurch express feeder auto									
Commissioning									
Commissioning									
Key									
Construction works									
Compound duration									

Compounds and construction sites

- 7.13.18 Within the Offchurch and Cubbington area a total of one main and six satellite construction compounds will be situated along the alignment of the Proposed Scheme. In addition to these there will be one Road head within this area, used as an access point onto the highway network for the mass haul.
- 7.13.19 The forecast size of the construction workforce required for each construction compound has been estimated from the construction activities associated with the design elements assigned to each compound. The peak and average daily workforce for each compound is shown in Table 7-205. Compounds with no workforce numbers are accessed via other compounds; where numbers are given they include all workers utilising that compound.
- 7.13.20 The location of the construction sites are shown on Map CT-05-088b to CT-05-093a (Volume 2, Map Book 17).

Table 7-205: Offchurch and Cubbington assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		average	peak
Satellite	Welsh Road Underbridge Compound	24	25
Satellite	Longhole Viaduct Compound (north)	-	-
Main	Fosse Way Main Compound	68	115
Road head	Fosse Way	10	10
Satellite	Hunningham Road Overbridge Compound	35	40
Satellite	River Leam Viaduct Compound	-	-
Satellite	Cubbington Retaining Wall Compound	92	130
Satellite	Coventry Road Overbridge Compound	23	25

Construction trip assumptions

Trip generation

- 7.13.21 Construction vehicle movements required to construct the Proposed Scheme include the delivery of plant and materials, movement of excavated materials and site worker trips to and from construction compounds. Construction routes have been determined based on the best available highway corridors between compounds and the strategic highway network with the aim of minimising impacts on local roads where practicable.
- 7.13.22 The duration of when there will be busy transport activity at each site is shown in Table 7-206. Some compounds only have traffic movements to other locations within the construction area. The data in Table 7-206 represent the periods when the construction traffic flows will be greater than 50% of the peak flows. Also shown is the estimated number of daily vehicle trips during the peak month of activity, the lower end of the range shows the average number of trips in the busy period and the upper end the peak month flows. The assessment scenario has assumed that the peak months of operation for each site occur at the same time, therefore the assessment is based on a worst case scenario.

Table 7-206: Offchurch and Cubbington typical vehicle trip generation for construction site compounds

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ LGV	HGV
Satellite	Welsh Road Underbridge Compound	Welsh Road	April 2018	3.5	30	40	15 - 30
Satellite	Longhole Viaduct Compound (north)	Track/haul route via Welsh Road Underbridge Compound	-	-	-	Few external movements	
Main	Fosse Way Main Compound	B4455 Fosse Way	April 2017	5	23	100 - 170	30 - 55
Road head	Fosse Way	B4455 Fosse Way	January 2019	2.5	20	-	200-220
Satellite	Hunningham	Hunningham	April 2018	2	13	60 - 65	35 - 50

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
	Road Overbridge Compound	Road					
Satellite	River Leam Viaduct Compound	Track/haul route via Hunningham Road Overbridge compound	-	-	-	Few external movements	
Satellite	Cublington Retaining Wall Compound	B4453 Rugby Road	Nov. 2018	2	22	140 - 190	65 - 90
Satellite	Coventry Road Overbridge Compound	Coventry Road	Nov. 2018	1	12	40	20

7.13.23 The assessment also includes for in-combination impacts by taking into account traffic and transport impacts of works being undertaken in neighbouring CFA areas. Construction traffic flows of 260 cars/LGV and 210 HGV per day inbound and 250 cars/LGV and 210 HGV per day outbound via the A425 Leamington Road from CFA16 (Ladbroke and Southam) and 150 cars/LGV and 70 HGV per day inbound and 130 cars/LGV and 70 HGV per day outbound via Bericote Road as generated from CFA18 (Stoneleigh, Kenilworth and Burton Green) in the adjacent CFAs have been included in the assessment.

Construction lorry routes

7.13.24 Construction trips will mainly occur along the alignment of the Proposed Scheme, however the main construction routes through the area will be as follows:

- Welsh Road, between the Grand Union canal in the south-east and Hunningham Road in the north-west; and
- B4455 Fosse Way, between approximately 170m north of Long Itchington Road in the north-east and the B4100 Banbury Road in the south-west.

7.13.25 The construction routes can be found on Map TR-03-117.

Traffic management, road closures and diversions

7.13.26 There are no highways in this area which will be subject to traffic management measures during the construction of the Proposed Scheme.

7.13.27 Overnight and/or weekend closures will be required to tie-in new highway diversions of the Proposed Scheme with the existing highways. These temporary closures will occur on the following highways:

- Welsh Road, between Ridgeway Lane and Welsh Road Farm;
- B4455 Fosse Way, between Long Itchington Road and Welsh Road;
- Hunningham Road, between Manor Farm and Fields Farm Cottages access road;
- B4453 Rugby Road, between the outskirts of Cubbington and South Cubbington Wood; and
- Coventry Road, between the outskirts of Cubbington and Furzen Hill Farm.

PRoW closures and diversions

7.13.28 In this area no PRoW will be closed during the construction phase of the Proposed Scheme, however three PRoW, W129y (Chainage 132+940), W129d (134+730) and W130 (135+150), will be subject to an approximately 105m, 20m and 20m diversion respectively.

Avoidance and mitigation

7.13.29 The following measures have been included as part of the engineering design of the Proposed Scheme in this area and will avoid or reduce impacts on transport users:

- construction materials and equipment will be transported along the haul road adjacent to the Proposed Scheme alignment where reasonably practicable, to reduce lorry movements on the public highway;
- the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in limited diversions of traffic onto alternative routes;
- the Proposed Scheme includes permanent realignments of six PRoW and one E-roads and temporary re-routeing as necessary to reduce loss of amenity;
- road closures will be limited to overnight and/or weekends;
- HGV route along the strategic road network and use designated routes for access as shown on Map TR-03-117 (Volume 5, Map Book, Traffic and Transport);
- materials will be transported where practicable by rail to reduce the potential

numbers of HGV trips that would otherwise be made on the highway network;
and

- provision of on-site accommodation and welfare facilities to reduce daily travel by site workers.

- 7.13.30 The draft Code of Construction Practice (CoCP) (see Volume 5: Appendix CT-003-000) includes measures that seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.
- 7.13.31 Where reasonably practicable, the number of private car trips to and from each site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an over-arching framework travel plan² that will require travel plans to be used along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where practicable, particularly in a rural context, this will encourage the use of sustainable modes of transport.
- 7.13.32 The measures in the CoCP will include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific traffic management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, footpaths and other PRow affected by the Proposed Scheme as necessary.
- 7.13.33 Specific measures will include:
- core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will therefore generally arrive before the AM peak hour and depart after the PM peak hour (although the assessment has assumed that some of work journeys to the construction sites take place within the AM and PM peak hours to reflect a reasonable worst case scenario) (draft CoCP, Section 5); and
 - excavated material will be reused wherever reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15).

² Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

Offchurch and Cubbington (CFA17) construction impacts

Key construction transport issues

- 7.13.34 This section considers the key transport issues during construction including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.

Road network traffic flows

- 7.13.35 There are no strategic routes that pass through the area.
- 7.13.36 Construction of the Proposed Scheme is forecast to result in substantial increases in daily traffic flows on certain roads within the Offchurch and Cubbington area as a result of designated construction routes through the area. It is noted that although the percentages are high the absolute increases on many of the roads are quite small. The links expected to be impacted are summarised in Table 7-207 and Table 7-208.

Table 7-207: Offchurch and Cubbington area construction traffic flows (vehicles) - AM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
Welsh Road, between the Grand Union canal and the B4455 Fosse Way	NB	74	81	86	7	5	5	6%	228%
	SB	52	57	100	6	43	4	75%	183%
Welsh Road, between the B4455 Fosse Way and Hunningham Road	EB	150	164	168	13	4	4	2%	46%
	WB	145	159	176	12	17	4	11%	52%
B4455 Fosse Way, between appr 170m north of Long Itchington Road and Welsh Road	NB	205	225	266	26	41	4	18%	18%
	SB	505	553	558	31	5	4	1%	15%
Hunningham Road, between Welsh Road and Fields Farm Cottages access track	NB	2	2	19	4	17	4	776%	100%
	SB	8	9	13	4	4	4	46%	100%

Table 7-208: Offchurch and Cubbington area construction traffic flows (vehicles) - PM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
Welsh Road, between the Grand Union canal and the B4455 Fosse Way	NB	46	50	87	3	37	1	73%	46%
	SB	65	71	73	3	2	1	3%	46%
Welsh Road, between the B4455 Fosse Way and Hunningham Road	EB	132	145	158	6	13	1	9%	18%
	WB	170	186	187	11	1	2	1%	23%
B4455 Fosse Way, between appr 170m north of Long Itchington Road and Welsh Road	NB	548	600	602	20	2	1	0%	5%
	SB	221	242	277	15	35	2	14%	15%
Hunningham Road, between Welsh Road and Fields Farm Cottages access track	NB	14	15	16	3	1	2	7%	183%
	SB	9	10	23	1	13	1	132%	100%

7.13.37 Capacities of single carriageway roads depend upon their geometry but a value of 1600 vehicles per hour per lane is specified within the Department for Transport's DMRB Volume 13. In this regard all the links assessed in the above table have forecasted traffic flows, including construction traffic, well within the link capacity for a single carriageway road.

7.13.38 In addition to the links identified above, the following roads will also be impacted by construction traffic as follows:

- B4455 Fosse Way, between Welsh Road and B4100 Banbury Road with 154 additional peak hour trips including 56 HGVs
- B4453 Rugby Road with 12 additional peak hour trips including 3 HGVs
- Coventry Road north of B4453 with 18 additional peak hour trips including 15 HGVs
- Kenilworth Road west of Rugby Road with 68 additional peak hour trips including 15 HGVs
- B4100 Banbury Road between Fosse Way and the A452 with 104 additional peak hour trips including 65 HGVs
- West Hill Road between A445 Leicester Lane and B4113 Stoneleigh Road with 80 additional peak hour trips including 19 HGVs

7.13.39 The increased traffic on these roads results in forecast traffic levels well within capacity of a single carriageway road and is not expected to substantially impact on capacity or congestion.

Junction performance

- 7.13.40 Junctions within this area have been assessed for the future baseline with construction traffic of the Proposed Scheme. The results of the junctions which are predicted to have flow/capacity values over 85% on one arm or more are presented in Table 7-209.

Table 7-209: Roundabout A452 Banbury Road/Warwick Bypass/Europa Way on approach to M40 - 2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A425 (N) South Bound	234	18%	0	234	18%	0
A452 Europa Way(W) East Bound	1123	82%	4	1123	84%	5
Banbury Road (S) North Bound	874	71%	2	907	70%	2
Warwick-By-Pass(E) West Bound	1240	91%	8	1311	95%	14
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A425 (N) South Bound	440	28%	0	440	29%	0
A452 Europa Way(W) East Bound	1237	78%	4	1237	80%	4
Banbury Road (S) North Bound	824	66%	2	888	70%	2
Warwick-By-Pass(E) West Bound	964	59%	1	994	62%	2

- 7.13.41 The modelling results demonstrate that the A452 Banbury Road/Warwick Bypass/Europa Way junction is approaching its theoretical capacity during the AM peak by 2021. However, the impact of the Proposed Scheme is not substantial.
- 7.13.42 In addition to the junctions identified above, there will be impacts of small amounts of construction traffic at other locations. At the junction between the B4455 Fosse Way and Welsh Road construction traffic is forecast to be 85 movements per hour including 16HGVs and at both the B4453 Rugby Road / Coventry Road and B4453 Rugby Road / Kenilworth Road junctions the construction traffic is forecast to be 68 movements per hour including 15 HGVs. These increases will not materially affect the capacity of these junctions.
- 7.13.43 The junction of B4455 Fosse Way and Long Itchington Road is assessed to operate well within capacity with flow/capacity ratios well below 85% during peak periods.

- 7.13.44 As mentioned earlier in this section, overnight and/or weekend closures will be required to tie-in new highway diversions of the Proposed Scheme with the existing highways. These temporary closures will occur on the following highways:
- Welsh Road, between Ridgeway Lane and Welsh Road Farm;
 - B4455 Fosse Way, between Long Itchington Road and Welsh Road;
 - Hunningham Road, between Manor Farm and Fields Farm Cottages access road;
 - B4453 Rugby Road, between the outskirts of Cubbington and South Cubbington Wood; and
 - Coventry Road, between the outskirts of Cubbington and Furzen Hill Farm.
- 7.13.45 These off peak closures will not have a substantial impact on road users.
- 7.13.46 Highway realignments in this area will result in changes in journey length. These changes will be permanent and are reported later in the Proposed Scheme operation section.
- 7.13.47 In order to access the River Leam Viaduct satellite compound the existing access track to Fields Farm and beyond will require to be upgraded to a suitable carriageway construction. These works will not cause substantial highway impacts.

Accidents and safety

- 7.13.48 No substantial accident clusters have been identified on routes used by construction traffic of the Proposed Scheme within Offchurch and Cubbington; construction traffic is not expected to substantially affect accident rates

Rail

- 7.13.49 There are no existing rail services in the area which could be affected by the construction of the Proposed Scheme.

Local bus and coach

- 7.13.50 It is not expected that the construction of the Proposed Scheme will require any bus route diversions, as road closures are only proposed overnight when bus services will not be operational.

Pedestrians, cyclists and equestrians

- 7.13.51 The main issues anticipated to arise as a result of the construction of the Proposed Scheme within the Offchurch and Cubbington area will be temporary diversions of PRow.

- 7.13.52 A total of six PRoW and one E-road will be permanently realigned in this area and are discussed in the operations section. Three of the six affected PRoW will be temporarily diverted during the construction phase of the Proposed Scheme. No E-roads will be subject to temporary diversions. Table 7-210 lists the PRoW subject to a temporary realignment, their diversion lengths and increase in journey times.

Table 7-210: Offchurch and Cubbington PRoW diversions

PRoW	Chainage	Diversion Length	Journey time increase
W129y	132+940	103m	Over 1 minute
W129d	134+730	18m	Less than 1 minute
W130	135+150	19m	Less than 1 minute

- 7.13.53 The above diversions will be of a minor length and affect low numbers of users (less than 60 users per day). Therefore it is considered that these changes will not adversely impact non-motorised users.
- 7.13.54 Note that impacts arising from permanent PRoW realignments are reported in the operations section below.

Waterways and canals

- 7.13.55 There is one navigable waterway, Grand Union Canal, within the Offchurch to Cubbington area. The impact of the construction of the Proposed Scheme on the Grand Union Canal is anticipated to be minimal since no stoppage of the waterway is proposed.

Offchurch and Cubbington (CFA17) Proposed Scheme operation description

Operation trip assumptions

Trip generation

- 7.13.56 During the operational phase of the Proposed Scheme only occasional trips will have to be made for maintenance purposes. These infrequent vehicle movements will be very low and will have no material impact on the operation of any junctions or highways within the study area.

Avoidance and mitigation measures

- 7.13.57 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads crossing the Proposed Scheme in, or very close to their current location, resulting in no lengthy diversions of traffic onto alternative routes; and
 - retaining PRoW crossing the Proposed Scheme, with any realignments kept to

a minimum where reasonably practicable.

Offchurch and Cubbington (CFA17) operation impacts

Key operation transport issues

- 7.13.58 This section considers the key transport issues during operations including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network
- 7.13.59 As previously set out, within the Offchurch and Cubbington area, there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore not considered further in this section.
- 7.13.60 This section considers the impacts on traffic and transport and the consequential impacts resulting from the operational phase of the Proposed Scheme.

Road network traffic flows

- 7.13.61 There are no strategic roads that pass through the Offchurch and Cubbington area.
- 7.13.62 A total of five roads will be realigned within this area. Table 7-211 illustrates the change in length of each highway. Negative values demonstrate a shortening of the highway compared to its original alignment.

Table 7-211: Offchurch and Cubbington permanent highway diversions

Highway	Change in Length
Welsh Road	60m
B4455 Fosse Way	No change in length (realignment of junction with Welsh Road)
Hunningham Road	-10m
B4453 Rugby Road	No change in length (introduction of new road overbridge)
Coventry Road	10m

- 7.13.63 The maximum increase in journey length of 60m equates to a journey time of less than one minute for pedestrians and significantly less for motorised traffic. This level of change will not substantially impact on transport users within this area.
- 7.13.64 In addition to the permanent road realignments, Long Itchington Road will be subject to a permanent closure. Traffic will be permanently diverted by approximately 330m onto the B4455 Fosse Way and Welsh Road. Due to the minimal diversion length, there will be no substantial impact on road users.

- 7.13.65 Overall, average travel times and journey time delays for vehicles through the area will be similar to those forecast without the Proposed Scheme in both 2026 and 2041.

Accidents and safety

- 7.13.66 The impact on accidents and safety will be negligible as there are no locations where there are existing highway safety issues or any material increases in traffic due to the operation of the Proposed Scheme.

Rail

- 7.13.67 Since there are no existing national or local rail services situated within this area, the Proposed Scheme will not impact on any rail services.

Local bus and coach

- 7.13.68 The Proposed Scheme will have no substantial impact on bus services which will cross the alignment of the Proposed Scheme. Bus services using Hunningham Road and the B4453 Rugby Road will be subject to no change in journey length and thus no change in journey times for public transport users.

Pedestrians, cyclists and equestrians

- 7.13.69 A total of six PRoW and one E-road will be realigned in this area. Of these, two PRoW (W192, Chainage 131+860 and W129d, 134+730) and one E-road (Ridgeway Lane, 129+680) will be realigned by less than 100m and one PRoW (W130, 135+150) will be reduced in length by approximately 15m.
- 7.13.70 The Proposed Scheme will impact on two PRoW (W128, 132+280 and W130b, 135+800) as a result of increased journey lengths of 360m and 200m respectively.
- 7.13.71 It is considered that these changes will not substantially adversely impact existing pedestrians, cyclist or equestrians.

Waterways and canals

- 7.13.72 The operation of the Proposed Scheme will have no substantial impact on the Grand Union Canal within this area.

7.14 Stoneleigh, Kenilworth and Burton Green (CFA18)

Stoneleigh, Kenilworth and Burton Green (CFA18) Proposed Scheme description

- 7.14.2 The Proposed Scheme through the Stoneleigh, Kenilworth and Burton Green area will be approximately 11km in length, extending from south of Stoneleigh Park to north of Burton Green.
- 7.14.3 Initially in cutting, the Proposed Scheme will pass underneath the A445 Leicester Lane before entering a partially retained cutting under the B4113 Stoneleigh Road and continuing through the eastern part of Stoneleigh Business Park.
- 7.14.4 The route will exit the north-western boundary of Stoneleigh Park, crossing the River Avon on a viaduct before passing beneath the B4115 Ashow Road and the A46 Kenilworth Bypass and then into cutting past Kenilworth Golf Club.
- 7.14.5 After leaving the cutting the route will pass under the raised Dalehouse Lane, cross over Finham Brook on viaduct and then into cutting past Milburn Grange Farm and under the Coventry to Leamington Rail Line and the A429 Kenilworth Bypass, to the north-east of Kenilworth. Canley Brook will be realigned to the north to allow the route to pass over on a viaduct as it rises into higher ground.
- 7.14.6 Running through undulating topography to Burton Green, the route will alternate between cutting and embankment and will pass under Crackley Lane. Approaching Burton Green the route will enter a cut and cover tunnel, following the footprint of the dismantled Kenilworth to Balsall line (Kenilworth Greenway), before entering a retained cutting to the south-west of the proposed Burton Green auto-transformer and feeder station. Climbing away from the cutting, the route will pass under the B4101 Waste Lane before leaving the Stoneleigh, Kenilworth and Burton Green area.
- 7.14.7 Offchurch and Cubbington (CFA17) lies to the south and Basall Common and Hampton in Arden (CFA23) lies to the north.

Stoneleigh, Kenilworth and Burton Green (CFA18) assessment methodology

- 7.14.8 Within the Stoneleigh, Kenilworth and Burton Green area, there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore focussed on the construction stage.

Stoneleigh, Kenilworth and Burton Green (CFA18) future baseline

Key future baseline transport issues

- 7.14.9 The key issue in relation to the future baseline in the Stoneleigh, Kenilworth and Burton Green area is the change in highway network flows due to background traffic growth. Some junctions are predicted to be operating over capacity in the future baseline scenario. For assessment purposes it has been assumed that there are no material changes to the highway or public transport networks in the future baseline. It is further assumed that there are no material changes to non-motorised traffic flows.

Land use assumptions

- 7.14.10 Future developments and land use changes are accounted for within the TEMPRO growth calculations. There are no substantial committed developments in proximity to the Proposed Scheme which are considered to require specific adjustment to the TEMPRO forecasts.

Transport supply assumptions

- 7.14.11 No material changes in transport supply are anticipated. It has been assumed that bus and rail services, along with PRoW usage, for future years of assessment will be the same as those currently operating. It is also assumed that no public transport or highway network improvements will be undertaken in the future baseline.

Traffic growth assumptions

- 7.14.12 The baseline traffic flows of junctions, as described in the baseline conditions section for the Stoneleigh, Kenilworth and Burton Green area, have been uplifted to establish the future baseline conditions for 2021 by applying TEMPRO Growth Rates to existing traffic flows.
- 7.14.13 The TEMPRO Growth rates applied in this area can be found in Table 7-212 and Table 7-213.

Table 7-212: TEMPRO Growth Rates for 2012 (CFA18)

Authority	Location	Zone	2012-2021	
			Average Weekday Peaks	
			AM	PM
Warwickshire	Warwick	Warwick	1.09	1.094
Warwickshire	Warwick	Rural	1.1	1.1
Warwickshire	Warwick	Leamington Spa	1.09	1.09
Warwickshire	Warwick	Kenilworth	1.09	1.09
Warwickshire	Warwick	Coventry (part of)	1.1	1.1

Table 7-213: TEMPRO Growth Rates for 2013 (CFA18)

Authority	Location	Zone	2013-2021	
			Average Weekday Peaks	
			AM	PM
Warwickshire	Warwick	Warwick	1.09	1.09
Warwickshire	Warwick	Rural	1.09	1.09
Warwickshire	Warwick	Leamington Spa	1.09	1.08
Warwickshire	Warwick	Kenilworth	1.09	1.09
Warwickshire	Warwick	Coventry (part of)	1.09	1.09

- 7.14.14 The factors have been derived for the individual road types and relevant wards. The assessment covers the AM and PM peak periods for an average weekday.

Strategic road network traffic flows

- 7.14.15 The directional future baseline traffic flows for the strategic road in this area which is likely to be affected by traffic changes as a result of the construction of the Proposed Scheme are contained in Table 7-214 and Table 7-215.

Table 7-214: Stoneleigh, Kenilworth and Burton Green strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual	All vehicles %
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A46 Kenilworth Bypass, between Stoneleigh Road and Leamington Road	NB	3304	135	3620	148	316	10%
	SB	3101	113	3397	124	296	10%

Table 7-215: Stoneleigh, Kenilworth and Burton Green strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual	All vehicles %
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A46 Kenilworth Bypass, between Stoneleigh Road and Leamington Road	NB	2981	114	3265	125	284	10%
	SB	2676	81	2931	89	255	10%

Local road network traffic flows

- 7.14.16 The directional future baseline traffic flows for local roads in the area which are likely to be affected by traffic changes as a result of the construction of the Proposed Scheme are contained within Table 7-216 and Table 7-217.

Table 7-216: Stoneleigh, Kenilworth and Burton Green local road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A445 Leicester Lane, between Coventry Road and Westhill Road	NB	418	7.18%	458	7.18%	40	9.7%
	SB	611	4.4%	670	4.42%	59	9.7%
B4113 Stoneleigh Road, between Coventry Road and Bericote Road/Westhill Road	NB	777	2.7%	852	2.70%	75	9.7%
	SB	472	2.8%	518	2.75%	46	9.7%
Dalehouse Lane, between Stoneleigh Road and Common Lane	EB	481	4.2%	525	4.16%	44	9.2%
	WB	326	5.8%	356	5.83%	30	9.2%
A429 Kenilworth Road, between Kenilworth and Gibbet Hill Road/Stoneleigh Road	NB	284	10.2%	311	10.21%	27	9.7%
	SB	316	10.8%	347	10.76%	31	9.7%

Table 7-217: Stoneleigh, Kenilworth and Burton Green local road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021			
		All vehicles	HGV	All vehicles	HGV	2021	2021
A446 Leicester Lane, between Kenilworth Road and approximately 230m east of Stone House Farm access road	NB	512	5.9%	562	5.9%	50	9.7%
	SB	402	1.7%	441	1.7%	39	9.7%
B4113 Stoneleigh Road, between Westhill Road and Stoneleigh Business Park	NB	447	2.5%	490	2.5%	43	9.7%
	SB	550	1.8%	603	1.8%	53	9.7%
Dalehouse Lane, between Dale House Farm and Stoneleigh Road	EB	253	3.6%	276	3.6%	23	9.2%
	WB	341	2.3%	372	2.3%	31	9.2%

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A429 Kenilworth Road, between Milburn Grange access road and the A45	NB	346	8.1%	379	8.1%	33	9.7%
	SB	289	5.9%	317	5.9%	28	9.7%

7.14.17 In addition to the links described in Table 7-216 and Table 7-217, the following will also be affected by the construction of the Proposed Scheme as a result of traffic flow increases due to construction and mass haul movements. These links are as follows:

- A452 from A46 junction to Bericote Road;
- Bericote Road and Westhill Road; and
- Stoneleigh Road between B4115 and A429.

Junction performance

7.14.18 The junctions within the Stoneleigh, Kenilworth and Burton Green area which have been identified as having potential to be impacted by additional traffic as generated by the construction movements of the Proposed Scheme are as follows:

- B4101 Waste Lane/Windmill Lane;
- A452 Kenilworth Road/B4101 Kelsey Lane;
- A46 Kenilworth Bypass/A452 Leamington Road;
- M40/A46 Kenilworth Bypass;
- A452 Kenilworth Road/B4115;
- Dalehouse Lane/Stoneleigh Road;
- A429 Kenilworth Road/Gibbett Hill Road/Stoneleigh Road;
- Cornets End Lane/B4102 Meriden Road/A452 Kenilworth Road;
- A445 Leicester Lane/Kenilworth Road;
- B4113 Stoneleigh Road/Westhill Road/Bericote Road;
- A452 Kenilworth Road/Bericote Road; and
- Stoneleigh Road/A46 Kenilworth Bypass.

- 7.14.19 Existing traffic flows, through the junctions have been uplifted to establish their future baseline flows to compare with capacities. Table 7-218 to Table 7-221 show the junctions which will operate with flow/capacity values over 85% on one arm or more in the future baseline scenario. The 85% ratio is considered to be the threshold above which the junction is approaching its practical traffic capacity. It should be noted that once the junction reaches capacity (100%), then the predicted queue lengths become less reliable as the modelling software is approaching the limits of its operating range.

Table 7-218: Stoneleigh, Kenilworth and Burton Green area future baseline performance at the A45/A452 Kenilworth Road roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A452 Chester Road	2080	96%	17	2302	108%	102
A45 Birmingham Road	607	51%	1	671	60%	1
A452 Kenilworth Road	1117	64%	2	1236	73%	3
A45 Coventry Road	1371	67%	2	1516	77%	3
17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A452 Chester Road	2373	108%	101	2627	121%	254
A45 Birmingham Road	522	44%	1	578	50%	1
A452 Kenilworth Road	1179	69%	2	1304	78%	3
A45 Coventry Road	1055	52%	1	1168	60%	2

Table 7-219: Stoneleigh, Kenilworth and Burton Green area future baseline performance at the B4113 Stoneleigh Road/Westhill Road/Bericote Road roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
B4113 Stoneleigh Road	525	42%	1	1437	119%	135
Westhill Road	745	64%	2	787	66%	2
B4113 Stoneleigh Road	383	39%	1	404	42%	1
Bericote Road	440	43%	1	464	46%	1

17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
B4113 Stoneleigh Road	516	45%	1	565	51%	1
Westhill Road	395	32%	1	432	36%	1
B4113 Stoneleigh Road	356	33%	1	390	37%	1
Bericote Road	439	40%	1	481	45%	1

Table 7-220: Stoneleigh, Kenilworth and Burton Green area future baseline performance at the A452 Kenilworth Road/Bericote Road roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A452 Kenilworth Road North	1543	80%	4	1627	85%	5
Bericote Road	465	46%	1	490	51%	1
A452 Kenilworth Road South	845	61%	2	891	65%	2
Hotel/Farm Access	12	3%	0	12	3%	0
17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A452 Kenilworth Road North	1425	74%	3	1561	81%	4
Bericote Road	486	44%	1	542	50%	1
A452 Kenilworth Road South	917	66%	2	1004	74%	3
Hotel/Farm Access	9	3%	0	10	3%	0

Table 7-221: Stoneleigh, Kenilworth and Burton Green area future baseline performance at the A429 Kenilworth Road/Gibbett Road/Stoneleigh Road roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A429 Kenilworth Road (east)	569	68%	13	624	87%	14
Stoneleigh Road	744	87%	26	816	102%	46
A429 Kenilworth Road (west)	742	88%	25	815	92%	29
Gibbet Hill Road (north)	600	75%	18	659	86%	22

17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A429 Kenilworth Road (east)	549	90%	20	599	108%	44
Stoneleigh Road	544	88%	13	578	107%	45
A429 Kenilworth Road (west)	387	61%	10	416	71%	12
Gibbet Hill Road (north)	954	84%	28	1041	88%	32

Stoneleigh, Kenilworth and Burton Green (CFA18) Proposed Scheme construction description

Construction activities

7.14.20 The major construction elements within the study area are as follows:

- retaining walls at Stoneleigh Park, Canley Brook, and Burton Green;
- Burton Green Tunnel; and
- Coventry-Leamington Spa Rail Overbridge.

7.14.21 Details of the construction phasing are summarised in Figure 7-21.

Figure 7-21: Stoneleigh, Kenilworth and Burton Green construction activity phasing

Construction activity	2017				2018				2019				2020				2021				2022				2023				2024				2025			
	quarters				quarters				quarters				quarters				quarters				quarters				quarters				quarters							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Advance works																																				
Civil engineering works																																				
A46 Kenilworth Bypass Main Compound																																				
Cubbington cutting																																				
Cubbington embankment																																				
Stonehouse Cutting																																				
Agriculture Centre embankment																																				
Glasshouse Wood cutting																																				
Glasshouse Wood embankment																																				
B4115 Ashow Road																																				
Kenilworth cutting																																				
Dalehouse Lane embankment																																				
Crackley Road cutting																																				
Crackley Wood embankment																																				
Roughknowles Wood cutting																																				
Satellite Compounds																																				
A445 Leicester Lane overbridge satellite compound																																				
A445 Leicester Lane overbridge																																				
Stoneleigh Park retaining wall satellite compound																																				

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Stoneleigh Park retaining wall																																				
B4113 Stoneleigh Road green overbridge																																				
River Avon viaduct (south and north) satellite compounds																																				
River Avon viaduct																																				
A46 Kenilworth Bypass overbridge satellite compound																																				
A46 Kenilworth Bypass overbridge																																				
Footpath K29 overbridge satellite compound																																				
Footpath K29 overbridge																																				
Finham Brook viaduct satellite compound																																				
Finham Brook viaduct																																				
Dalehouse Lane overbridge																																				
Coventry to Leamington Spa Line overbridge satellite compounds																																				
Millburn Grange Farm accommodation overbridge																																				
Coventry to Leamington Spa Line overbridge																																				
A429 Kenilworth Road overbridge																																				
Canley Brook retaining wall																																				

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Canley Brook viaduct satellite compound																																				
Canley Brook viaduct																																				
Crackley Lane overbridge satellite compound																																				
Canley Brook viaduct																																				
Bridleway W164 overbridge																																				
Crackley Lane overbridge																																				
North Crackley Wood cutting																																				
Cromwell Lane satellite compound																																				
Footpath W168 overbridge																																				
Burton Green green tunnel (including portals)																																				
Burton Green retaining structure																																				
Black Waste Wood embankment																																				
B4101 Waste Lane overbridge satellite compound																																				
B4101 Waste Lane overbridge																																				
Burton Green retaining structure																																				
Rail infrastructure and systems works																																				
Kingsbury Road railhead (see CFA20)																																				
Track laying																																				
Burton Green auto-transformer feeder station satellite compound																																				
A423 Banbury Road Main Compound (see CFA16)																																				
Satellite Compounds																																				

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Furzen Hill auto-transformer station satellite compound																																				
Coventry to Leamington Spa Line satellite compounds 1 and 2																																				
Crackley auto-transformer station satellite compound																																				
Burton Green green tunnel (south portal) satellite compound																																				
Commissioning																																				
Key:																																				

Compounds and construction sites

- 7.14.22 Within the Stoneleigh, Kenilworth and Burton Green area a total of one main and 13 satellite construction compounds will be situated along the alignment of the Proposed Scheme. In addition to these there will be three Road heads within this area, used as access points on to the highway network for the mass haul.
- 7.14.23 The forecast size of the construction workforce required for each construction compound has been estimated from the construction activities associated with the design elements assigned to each compound. The peak and average daily workforce for each compound is shown in Table 7-222. Compounds with no workforce numbers are accessed via other compounds; where numbers are given they include all workers utilising that compound.
- 7.14.24 The location of compounds is shown on Map CT-05-092b to CT-05-100b (Volume 2, Map Book 18)

Table 7-222: Stoneleigh, Kenilworth and Burton Green assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		average	peak
Satellite	A445 Leicester Lane Overbridge Compound	19	20
Satellite	Stoneleigh Park Retaining Wall Compound	126	147
Satellite	River Avon Viaduct Compound (south)	-	-
Main	A46 Kenilworth Bypass Overbridge Main Compound	-	-
Satellite	River Avon Viaduct Compound (north)	-	-
Satellite	Finham Brook Viaduct Compound	34	35
Satellite	A46 Kenilworth Bypass Overbridge Compound	71	130
Satellite	Footpath K29 Overbridge Compound	-	-
Satellite	Coventry-Leamington Spa Line Overbridge Compound (south-west)	53	120

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		average	peak
Satellite	Coventry-Leamington Spa Line Overbridge Compound (south-east)	-	-
Satellite	Canley Brook Viaduct Compound	-	-
Satellite	Crackley Lane Overbridge Compound	30	55
Satellite	Cromwell Lane Compound	94	115
Satellite	B4101 Waste Lane Overbridge Compound	19	20
Road head	A46 Kenilworth Bypass southbound	10	10
Road head	A429 Kenilworth Road	10	10
Road head	B4101 Waste Lane	10	10

Construction trip assumptions

Trip generation and mode share

- 7.14.25 Construction vehicle movements required to construct the Proposed Scheme include the delivery of plant and materials, movement of excavated materials and site worker trips to and from construction compounds. Construction routes have been determined based on the best available highway corridors between compounds and the strategic highway network with the aim of minimising impacts on local roads where practicable.
- 7.14.26 The duration of when there will be busy transport activity at each site is shown in Table 7-223. Some compounds only have traffic movements to other locations within the construction area. The data in Table 7-223 represent the periods when the construction traffic flows will be greater than 50% of the peak flows. Also shown is the estimated number of daily vehicle trips during the peak month of activity, the lower end of the range shows the average number of trips in the busy period and the upper end the peak month flows. The assessment scenario has assumed that the peak month of operation for each site occur at the same time, therefore the assessment is based on a worst case scenario.

Table 7-223: Stoneleigh, Kenilworth and Burton Green typical vehicle trip generation for construction site compounds

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/ LGV	HGV
Satellite	A445 Leicester Lane Overbridge Compound	A445 Leicester Lane, Westhill Road, A452 Leamington Road and then onto the A46 and M40	Apr 2018	1	10	35	25 – 30
Satellite	Stoneleigh Park Retaining Wall Compound	B4113 Stoneleigh Road, Bericote Road, A452 Leamington Road and then onto the A46 and M40.	Apr 2020	2	24	195 - 215	110 – 130
Satellite	River Avon Viaduct Compound (south)	Track/haul route via Stoneleigh Road Overbridge Compound	-	-	-	Few external movements	
Main	A46 Kenilworth Bypass Overbridge Main Compound	B4115 Ashow Road, Stoneleigh Road, A46 to join the M40.	Apr 2017	5.5	23	145 - 190	45 - 55
Satellite	River Avon Viaduct Compound (north)	Track/haul route via A46 Kenilworth Bypass Overbridge Main Compound	-	-	-	Few external movements	
Satellite	Finham Brook Viaduct Compound	Dalehouse Lane	Dec 2018	2	13	60	45 - 50
Satellite	A46 Kenilworth Bypass Overbridge Compound	Track/haul route via Finham Brook Viaduct Compound	-	-	-	Few external movements	
Satellite	Footpath K29 Overbridge Compound	Track/haul route via Finham Brook Viaduct Compound	-	-	-	Few external movements	
Satellite	Coventry-Leamington Spa	A429 Kenilworth Road, Stoneleigh Road, A46 to	Apr 2018	4	14	145 - 170	100 - 110

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
	Line Overbridge Compound (south-west)	join the M40.					
Satellite	Coventry-Leamington Spa Line Overbridge Compound (south-east)	Track/haul route via Coventry-Leamington Rail Overbridge Compound (south-west)	-	-	-	Few external movements	
Satellite	Canley Brook Viaduct Compound	Track/haul route via Coventry-Leamington Rail Overbridge Compound (south-west)	-	-	-	Few external movements	
Satellite	Crackley Lane Overbridge Compound	Cryfield Grange Road onto A429 Kenilworth Road, Stoneleigh Road, A46 to join the M40	Apr 2018	3	37	50 - 85	45 - 60
Satellite	Cromwell Lane Compound	Cromwell Lane, Hob Lane, Windmill Lane, Kelsey Lane, A452, A45 west to the M42.	Dec 2017	3	36	140 - 165	60 - 75
Satellite	B4101 Waste Lane Overbridge Compound	B4101 Waste Lane, Kelsey Lane, A452, A45 west to the M42.	Dec 2020	1.5	14	35	20 - 30
Road head	A46 Kenilworth Bypass southbound road head	B4115 Ashow Road, Stoneleigh Road, A46 Kenilworth Bypass southbound to join the M40 or northbound to A45 to join the M42	May 2019	3	36	-	365
Road head	A429 Kenilworth Road road head	A429 Kenilworth Road, Stoneleigh Road, A46 to join the M40 or A45 to join the M42.	Jul 2020	3	35	-	350
Road head	Waste Lane east and westbound	B4101 Waste Lane, Kelsey Lane, A452, A45	Oct 2021	1	9	-	65

Compound Type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
	road head	west to the M42.					

7.14.27 The assessment also includes in-combination impacts by taking into account traffic and transport impacts of works being undertaken in neighbouring CFA areas. Construction traffic flows of 130 cars/LGV and 70 HGV inbound per day and 150 cars/LGV and 70 HGV per day outbound via Westhill Road as generated from CFA17 (Offchurch and Cubbington) 120 cars/LGV and 540 HGV inbound per day and 100 cars/LGV and 540 HGV per day outbound via the B4101 Waste Lane and the A452 Kenilworth Road as generated from CFA23 (Balsall Common and Hampton in Arden) in the adjacent CFAs have been included in the assessment for this area.

Construction lorry routes

7.14.28 Construction trips will mainly occur along the alignment of the Proposed Scheme, however the main construction routes through the area will be as follows:

- B4113 Stoneleigh Road, between Bericote Road and Stoneleigh Business Park;
- Bericote Road, between the B4115 Stoneleigh Road and the A452 Kenilworth Road;
- A452 Leamington Road, between Bericote Road and the A46;
- A46 Kenilworth Bypass, between the M40 and Stoneleigh Road;
- B4115 Ashow Road, between approximately 150m west of Stoneleigh Business Park access road and Birmingham Road/Stoneleigh Road;
- Stoneleigh Road, between the B4115 Ashow Road and the A429 Kenilworth Road;
- Dalehouse Lane, from its junction with Stoneleigh Road for a stretch of approximately 850m;
- A429 Kenilworth Road, between Milburn Grange Farm access and Stoneleigh Road;
- A45, between the A46 and the M42 in CFA24;
- Cromwell Lane, between Red Lane and Windmill Lane;
- Windmill Lane, between Cromwell Lane and the B4101 Waste Lane; and

- B4101 Waste Lane, Kenilworth Greenway and the A452 Kenilworth Road.

7.14.29 The construction routes can be found on Map TR-03-118 (Volume 5, Map Book 71).

Traffic management, road closures and diversions

7.14.30 Traffic management will be in place on the A46 Kenilworth Bypass and single lane working with traffic light control will be implemented on Cromwell Lane. These measures will have no substantial affect on traffic congestion in this area.

7.14.31 Overnight and/or weekend closures will be required to tie-in new highway diversions of the Proposed Scheme with the existing highways. These temporary closures will occur on the following highways:

- A445 Leicester Lane, between immediately south of Leicester Lane Cottages and Coventry Road;
- Stareton Road, from the B4113 Stoneleigh Road for approximately 400m;
- B4113 Stoneleigh Road, between River Avon and Stonehouse Farm access road;
- B4115 Ashow Road, between Crew Lane and approximately 360m south-west of Birmingham Road/Stoneleigh Road;
- A429 Kenilworth Road, between the outskirts of Coventry and the outskirts of Crackley;
- Dalehouse Lane, between Hope Barn access road and approximately 250m south of Dale House Farm access road;
- Crackley Lane, between Blind Lane and Cryfield Grange Road; and
- B4101 Waste Lane, between approximately 250m east of Old Waste Lane and approximately 250m west of Hodgett's Lane.

PRoW closures and diversions

7.14.32 In this area no PRoW will be closed during the construction phase of the Proposed Scheme, however three PRoW, K29 (Chainage 140+970), M186 (147+170) and Kenilworth Greenway will be subject to diversions of 550m, 70m and 1.6km respectively.

Avoidance and mitigation

7.14.33 The following measures have been included as part of the engineering design of the Proposed Scheme in this area and will avoid or reduce impacts on transport users:

- construction materials and equipment will be transported along haul roads

adjacent to the Proposed Scheme alignment, where reasonably practicable, to reduce lorry movements on the public highway;

- the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in limited diversions of traffic onto alternative routes;
- road closures will be limited to overnight and/or weekends where reasonably practicable;
- Cromwell Lane remains single lane working to accommodate Kenilworth Greenway, it will become traffic light controlled;
- the Proposed Scheme includes permanent realignments of 13 PRow and temporary re-routeing as necessary to minimise loss of amenity;
- HGV route along the strategic road network and use designated routes for access as shown on Map TR-03-118 (Volume 5, Map Book, Traffic and Transport);
- materials will be transported by rail, where practicable, to reduce the potential numbers of HGV trips that would otherwise be made on the highway network; and
- provision of on-site accommodation and welfare facilities to reduce daily travel by site workers.

7.14.34 The draft Code of Construction Practice (CoCP) (see Volume 5: Appendix CT-003-000) includes measures that seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

7.14.35 Where reasonably practicable, the number of private car trips to and from each site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an over-arching framework travel plan³ that will require travel plans to be used along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where practicable, particularly in a rural context, this will encourage the use of sustainable modes of transport.

³ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

- 7.14.36 The measures in the CoCP will include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific traffic management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, footpaths and other PRow affected by the Proposed Scheme as necessary.
- 7.14.37 Specific measures will include:
- core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will therefore generally arrive before the AM peak hour and depart after the PM peak hour (although the assessment has assumed that some of work journeys to the construction sites take place within the AM and PM peak hours to reflect a reasonable worst case scenario) (draft CoCP, Section 5); and
 - excavated material will be reused wherever reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15).

Stoneleigh, Kenilworth and Burton Green (CFA18) construction impacts

Key construction transport issues

- 7.14.38 This section considers the key transport issues during construction including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.

Strategic road network traffic flows

- 7.14.39 Construction of the Proposed Scheme is forecast to result in substantial increases in daily traffic flows on certain roads within the Stoneleigh, Kenilworth and Burton Green area as a result of designated construction routes through the area. The strategic roads expected to be impacted are summarised in Table 7-224 and Table 7-225.

Table 7-224: Stoneleigh, Kenilworth and Burton Green area construction traffic flows (vehicles) - AM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A46 Kenilworth Bypass, between Stoneleigh Road and Leamington Road	NB	3304	3620	3854	274	234	126	6%	85%
	SB	3101	3397	3525	251	128	127	4%	102%

Table 7-225: Stoneleigh, Kenilworth and Burton Green area construction traffic flows (vehicles) - PM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A46 Kenilworth Bypass, between Stoneleigh Road and Leamington Road	NB	2981	3265	3378	237	113	112	3%	90%
	SB	2676	2931	3144	200	213	111	7%	125%

7.14.40 Capacities of dual carriageway roads depend upon their geometry but a value of up to 2100 per hour per lane is specified within the Department for Transport's DMRB Volume 13. In this regard all the links assessed in the above table have forecasted traffic flows, including construction traffic, within the link capacity for a dual carriageway road.

Local road network traffic flows

7.14.41 Construction of the Proposed Scheme is forecast to result in substantial increases in daily traffic flows on certain roads within the Stoneleigh, Kenilworth and Burton Green area as a result of designated construction routes through the area. The links expected to be impacted are summarised in Table 7-226 and Table 7-227. Although some of the percentages are high the absolute increases on many of the roads are quite small.

Table 7-226: Stoneleigh, Kenilworth and Burton Green area construction traffic flows (vehicles) - AM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A445 Leicester Lane, between Coventry Road and Westhill Road	NB	418	458	467	35	9	2	2%	6%
	SB	611	670	673	32	3	2	0%	7%
B4113 Stoneleigh Road, between Coventry Road	NB	777	852	909	32	57	9	7%	39%

and Bericote Road/Westhill Road	SB	472	518	529	23	11	9	2%	63%
Dalehouse Lane, between Stoneleigh Road and Common Lane	EB	481	525	529	26	4	4	1%	18%
	WB	326	356	371	25	15	4	4%	19%
A429 Kenilworth Road, between Kenilworth and Gibbet Hill Road/Stoneleigh Road	NB	284	311	409	127	98	95	32%	299%
	SB	316	347	498	133	151	96	44%	257%

Table 7-227: Stoneleigh, Kenilworth and Burton Green area construction traffic flows (vehicles) - PM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A445 Leicester Lane, between Coventry Road and Westhill Road	NB	512	562	563	34	1	1	0%	3%
	SB	402	441	448	8	7	0	2%	0%
B4113 Stoneleigh Road, between Coventry Road and Bericote Road/Westhill Road	NB	447	490	494	15	4	3	1%	25%
	SB	550	603	650	14	47	3	8%	27%
Dalehouse Lane, between Stoneleigh Road and Common Lane	EB	253	276	288	11	12	1	4%	10%
	WB	341	372	373	11	1	2	0%	23%
A429 Kenilworth Road, between Kenilworth and Gibbet Hill Road/Stoneleigh Road	NB	346	379	518	118	139	87	37%	283%
	SB	289	317	405	106	88	87	28%	467%

7.14.42 Capacities of single carriageway roads depend upon their geometry but a value of 1600 vehicles per hour per lane is specified within the Department for Transport's DMRB Volume 13. In this regard all the links assessed in the above table have forecasted traffic flows, including construction traffic, well within the link capacity for a single carriageway road.

7.14.43 In addition to the links identified above, the following roads will also be impacted by construction traffic as follows for the AM peak hour in 2021:

- A452 from A46 junction to Bericote Road with an increase of 37 HGVs
- Bericote Road and Westhill Road with an increase of 80 vehicles including 19 HGVs
- Stoneleigh Road between B4115 and A429 with an increase of 82 vehicles including 25 HGVs

- 7.14.44 The increased traffic on these roads results in forecast traffic levels well within capacity of a single carriageway road and is not expected to substantially impact on capacity or congestion.

Junction performance

- 7.14.45 Junctions within this area have been assessed for the future baseline with construction traffic of the Proposed Scheme. The results of the junctions which are predicted to have flow/capacity values over 85% on one arm or more are presented in Table 7-228 to Table 7-234.

Table 7-228: Priority junction A452 Kenilworth Road/B4101 Kelsey Lane - 2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
B4101 Kelsey Lane (east)	145	72%	5	175	79%	6
A452 Kenilworth Road (south)	589	68%	13	589	68%	13
A4101 Alder Lane (west)	298	76%	8	298	80%	9
A452 Kenilworth Road (north)	560	67%	12	723	89%	20
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
B4101 Kelsey Lane (east)	332	81%	6	393	91%	17
A452 Kenilworth Road (south)	702	68%	13	702	76%	20
A4101 Alder Lane (west)	175	80%	9	175	88%	9
A452 Kenilworth Road (north)	708	81%	16	816	91%	30

- 7.14.46 The modelling results demonstrate that the A452 Kenilworth Road/B4101 Kelsey Lane junction is approaching its practical traffic capacity during the PM peak in the 2021 baseline. The junction operates over this capacity level with the Proposed Scheme but the impact is not considered substantial.

Table 7-229: Roundabout A46 Kenilworth Bypass/A452 Leamington Road - 2021 Future Baseline without and with Proposed Scheme: AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A46 NE	716	49%	1	760	56%	1
A452 SE	1119	70%	2	1211	77%	3
A46 SW	655	43%	1	948	64%	2
A452 NW	968	69%	2	1017	81%	4

17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A46 NE	884	58%	1	999	67%	2
A452 SE	1308	84%	5	1467	98%	21
A46 SW	692	52%	1	722	55%	1
A452 NW	793	56%	1	843	60%	2

7.14.47 The modelling results demonstrate that the A46 Kenilworth Bypass/A452 Leamington Road junction is approaching its practical traffic capacity during the PM peak in the 2021 baseline. The junction operates over this capacity level on one arm during the PM peak with the Proposed Scheme and overall the impact is not considered substantial.

Table 7-230: Roundabout A45/A452 Kenilworth Road- 2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A452 Chester Road (north)	2302	108%	102	2794	136%	430
A45 Birmingham Road (east)	671	60%	1	1099	91%	8
A452 Kenilworth Road (south)	1236	73%	3	1443	92%	10
A45 Coventry Road (west)	1516	77%	3	1593	98%	20

17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A452 Chester Road (north)	2627	121%	254	3119	147%	657
A45 Birmingham Road (east)	578	50%	1	1006	81%	4
A452 Kenilworth Road (south)	1304	78%	3	1539	100%	27
A45 Coventry Road (west)	1168	60%	2	1193	73%	3

- 7.14.48 The modelling results demonstrate that the A45/A452 Kenilworth Road junction is predicted to be operating over capacity on one arm in the peak hours in the 2021 baseline scenario. However the queues reported are likely to be overestimated as the analysis assumes background traffic growth is unconstrained, which is unlikely to be the case on a congested highway network. Construction traffic will increase queues and delays at the junction although these are likely to be overstated due to the over estimating of congestion impacts in the future baseline. Measures to control peak hour construction flows are included in the draft CoCP and it is expected that these will be used to ensure that overall levels of congestion are maintained at acceptable levels during the construction of the Proposed Scheme.

Table 7-231: A445 Leicester Lane/Kenilworth Road -2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A445 NE	673	61%	2	678	64%	2
Kenilworth Road	631	82%	4	648	84%	5
A445 SW	716	84%	5	716	85%	5
Westhill Road	362	34%	1	439	42%	1
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A445 NE	496	52%	1	503	53%	1
Kenilworth Road	329	38%	1	380	44%	1
A445 SW	678	62%	2	678	64%	2
Westhill Road	645	60%	1	653	61%	2

- 7.14.49 The modelling results demonstrate that the Proposed Scheme has a minimal impact on the capacity of the A445 Leicester Lane/Kenilworth Road junction.

Table 7-232: Roundabout B4113 Stoneleigh Road/Westhill Road/Bericote Road -2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
B4113 Stoneleigh Road	1437	119%	135	1457	125%	175
Westhill Road	787	66%	2	800	67%	4
B4113 Stoneleigh Road	404	42%	1	404	43%	2
Bericote Road	464	46%	1	608	61%	3

17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
B4113 Stoneleigh Road	565	51%	1	615	55%	2
Westhill Road	432	36%	1	490	42%	1
B4113 Stoneleigh Road	390	37%	1	390	40%	1
Bericote Road	481	45%	1	496	46%	2

7.14.50 The modelling results demonstrate that the B4113 Stoneleigh Road/Westhill Road/Bericote Road junction operates over capacity on one arm in the AM peak in the 2021 baseline scenario. However the queues reported are likely to be overestimated as the analysis assumes background traffic growth is unconstrained, which is unlikely to be the case on a congested highway network. Construction traffic will increase queues and delays on this arm but the overall impact on congestion is unlikely to be substantial due to the over estimating of congestion impacts in the future baseline.

Table 7-233: A452 Kenilworth Road/Bericote Road -2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A452 Kenilworth Road North	1627	85%	5	1770	92%	145
Bericote Road	490	51%	1	532	55%	18
A452 Kenilworth Road South	891	65%	2	891	67%	29
Hotel/Farm Access	12	3%	0	12	4%	1
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A452 Kenilworth Road North	1561	81%	4	1576	82%	4
Bericote Road	542	50%	1	640	61%	2
A452 Kenilworth Road South	1004	74%	3	1004	78%	4
Hotel/Farm Access	10	3%	0	10	4%	0

- 7.14.51 The modelling results demonstrate that the A452 Kenilworth Road/Bericote Road junction is at its practical traffic capacity during the AM peak in the 2021 baseline. Construction traffic will increase queues and delays at the junction. The queuing though is likely to be overstated since the modelling software is approaching the limits of its operating range, as the junction approaches its theoretical capacity, and overall the impact on congestion is unlikely to be substantial at this junction. In addition, the draft CoCP includes measures to control peak hour construction flows and it is expected that these will be used to ensure that overall levels of congestion are maintained at acceptable levels during the construction of the Proposed Scheme.

Table 7-234: Signalised junction A429 Kenilworth Road/Gibbett Hill Road/Stoneleigh Road -2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A429 Kenilworth Road (east)	624	87%	14	784	114%	22
Stoneleigh Road	816	102%	46	897	106%	66
A429 Kenilworth Road (west)	815	92%	29	1005	116%	103
Gibbet Hill Road (north)	659	86%	22	659	80%	21
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A429 Kenilworth Road (east)	599	108%	44	767	144%	140
Stoneleigh Road	578	107%	45	586	104%	30
A429 Kenilworth Road (west)	416	71%	12	648	129%	42
Gibbet Hill Road (north)	1041	88%	32	1041	87%	31

- 7.14.2 The modelling results demonstrate that the A429 Kenilworth Road/Gibbett Hill Road/Stoneleigh Road junction is predicted to be operating over capacity in the peak hours in the 2021 baseline scenario. However the queues reported are likely to be overestimated as the analysis assumes background traffic growth is unconstrained, which is unlikely to be the case on a congested highway network. Construction traffic will increase queues and delays at the junction but the overall impact on congestion is unlikely to be substantial due to the over estimating of congestion impacts in the future baseline. In addition, the draft CoCP includes measures to control peak hour construction flows and it is expected that these will be used to ensure that overall levels of congestion are maintained at acceptable levels during the construction of the Proposed Scheme.

- 7.14.3 In addition to the junctions identified above, one junction along Stoneleigh Road with the A46 will be subject to small amounts of construction traffic. These flows are forecast to be 82 movements per hour including 25 HGVs and will not materially affect the capacity of the junction.
- 7.14.4 Overnight and/or weekend road closures will be required to tie-in new highway realignments to the existing highways. These temporary closures will occur on the following highways:
- A445 Leicester Lane, between immediately south of Leicester Lane Cottages and Coventry Road;
 - Stareton Road, from the B4113 Stoneleigh Road for approximately 400m;
 - B4113 Stoneleigh Road, between River Avon and Stonehouse Farm access road;
 - B4115 Ashow Road, between Crew Lane and approximately 360m south-west of Birmingham Road/Stoneleigh Road;
 - A429 Kenilworth Road, between the outskirts of Coventry and the outskirts of Crackley;
 - Dalehouse Lane, between Hope Barn access road and approximately 250m south of Dale House Farm access road;
 - Crackley Lane, between Blind Lane and Cryfield Grange Road; and
 - B4101 Waste Lane, between approximately 250m east of Old Waste Lane and approximately 250m west of Hodgett's Lane.
- 7.14.5 These off peak closures will not have a substantial impact on road users.
- 7.14.6 Highway realignments in this area will result in changes in journey length. These changes will be permanent and are reported later in the Proposed Scheme operations section.

Accidents and safety

- 7.14.7 No substantial accident clusters have been identified on routes used by construction traffic of the Proposed Scheme within the Stoneleigh, Kenilworth and Burton Green area; construction traffic is not expected to substantially affect accident rates.

Rail

- 7.14.8 Rail possessions will aim to minimise any disruptions to passenger and freight services. As the possessions are not anticipated to exceed four consecutive weeks in any 12 month period, the impact on public transport delay is not considered to be substantial.

Local bus and coach

- 7.14.9 It is not expected that the construction of the Proposed Scheme will require any bus route diversions, as road closures are only proposed overnight when bus services will not be operational.

Pedestrians, cyclists and equestrians

- 7.14.10 The main issues anticipated to arise as a result of the construction of the Proposed Scheme within the Stoneleigh, Kenilworth and Burton Green area will be temporary diversions of PRow.
- 7.14.11 A total of 13 PRow will be permanently realigned in this area and are discussed in the operations section. Three of the 13 affected PRow will be temporarily diverted during the construction phase of the Proposed Scheme. Table 7-235 lists the PRow subject to a temporary realignment, their diversion lengths and increase in journey times.

Table 7-235: Stoneleigh, Kenilworth and Burton Green PRow diversions

PRow	Chainage	Diversion Length	Journey time increase
K29	140+970	550m	7min
M186	147+170	70m	Less than 1min
Kenilworth Greenway	-	1.6km	20min

- 7.14.12 The above diversions for K29 and M186 will be of a minor length and affect low numbers of users (less than 90 users per day). Therefore it is considered that these changes will not adversely impact non-motorised users. The temporary diversion of the Kenilworth Greenway will affect higher volumes of users (approximately 550 users per day) and will be diverted by a considerable distance. This change will result in a temporary but substantial impact to non-motorised users, during the construction period.
- 7.14.13 Note that impacts arising from permanent PRow realignments are reported in the operations section below.

Waterways and canals

- 7.14.14 There are no navigable waterways in the area.

Stoneleigh, Kenilworth and Burton Green (CFA18) Proposed Scheme operation description

Operation trip assumptions

Trip generation

- 7.14.15 During the operational phase of the Proposed Scheme only occasional trips will have to be made for maintenance purposes. These infrequent vehicle movements will be very low and will have no material impact on the operation of any junctions or highways within the study area.

Avoidance and mitigation measures

- 7.14.16 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads crossing the Proposed Scheme in, or very close to their current location, resulting in no lengthy diversions of traffic onto alternative routes; and
 - retaining PRoW crossing the Proposed Scheme, with any realignments kept to a minimum where reasonably practicable.

Stoneleigh, Kenilworth and Burton Green (CFA18) operation impacts

Key operation transport issues

- 7.14.17 This section considers the key transport issues during operations including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.
- 7.14.18 As previously set out, within Stoneleigh, Kenilworth and Burton Green area, there will be no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore not considered further in this section.
- 7.14.19 This section considers the impacts on traffic and transport and the consequential impacts resulting from the operational phase of the Proposed Scheme.

Strategic road network traffic flows

- 7.14.20 There will be no impact on the only strategic road, the A46 Kenilworth Bypass, within this area.

Local road network traffic flows

- 7.14.21 A total of eight roads will be realigned within this area. Table 7-236 illustrates the change in length of each highway. Negative values demonstrate a shortening of the highway compared to its original alignment.

Table 7-236: Stoneleigh, Kenilworth and Burton Green permanent highway realignments

Highway	Change in Length
A445 Leicester Lane	-40m
Stareton Road	-110m
B4113 Stoneleigh Road	55m
B4115 Ashow Road	15m
Dalehouse Lane	No change in length (introduction of new road overbridge)
A429 Kenilworth Road	15m
Crackley Lane	5m
B4101 Waste Lane	No change in length (introduction of new road overbridge)

7.14.22 The maximum increase in journey length of 55m equates to a journey time increase of approximately 40 seconds for pedestrians and significantly less for motorised traffic. The maximum decrease in journey length of 110m equates to a journey time decrease of just over one minute for pedestrians and significantly less for motorised traffic. These levels of change will not substantially impact on transport users within this area.

7.14.23 Overall, average travel times and journey time delays for vehicles through the area will be similar to those forecasted without the Proposed Scheme in both 2026 and 2041.

Accidents and safety

7.14.24 The impact on accidents and safety will be negligible as there are no locations where there are existing accident clusters or any material increases in traffic due to the operation of the Proposed Scheme.

Rail

7.14.25 During the operational phase no local or national rail services will be impacted by the Proposed Scheme.

Local bus and coach

7.14.26 The Proposed Scheme will have no substantial impact on bus services which will cross the alignment of the Proposed Scheme. Bus services using the B4115 Ashow Road and A429 Kenilworth Road will be subject to a 15m increase in journey length. Changes of this magnitude will not materially affect overall journey times or delays for public transport users.

7.14.27 Bus services using the A46 Kenilworth Bypass, Dalehouse Lane and Cromwell Lane will experience no change in journey times.

Pedestrians, cyclists and equestrians

- 7.14.28 A total of 13 PRoW will be realigned within this area. Of these, six PRoW (K29, 140+970; W168, 145+140; M182, 146+440; M186, 147+170; M184, 147+630 and Kenilworth Greenway) will be realigned by less than 100m and thus will have no substantial affect on pedestrians, cyclists and equestrians.
- 7.14.29 The Proposed Scheme will have a small impact on six PRoW (W171, 138+620; W164, 143+100; W165x, 143+680; W169, 146+030; M187, 146+880 and M198, 147+870). The maximum realignment of those will be approximately 375m (W165x), which will result in a maximum journey time increase of 5 minutes.
- 7.14.30 One PRoW (W167, 144+450) will be realigned by approximately 800m. Non-motorised users of this PRoW will be subject to a journey time increase of 10 minutes.
- 7.14.31 It is considered that overall these changes will not substantially adversely impact existing pedestrians, cyclist or equestrians.

Waterways and canals

- 7.14.32 There are no navigable waterways within this area.

7.15 Coleshill Junction (CFA19)

Coleshill Junction (CFA19) Proposed Scheme description

- 7.15.2 The Coleshill Junction area covers an approximately 13km section of the Proposed Scheme in North Warwickshire, where it passes to the west of Coleshill. It extends from the M6 in the south to the boundary between Coleshill and Curdworth parishes in the north and the boundary between Water Orton parish and Birmingham in the north-west. Parts of Solihull are included within the area, west of the M6 and the Proposed Scheme. The area includes land within the parishes of Coleshill, Fordbridge, Kingshurst, Smith's Wood and Water Orton.
- 7.15.3 The area includes the delta junction of the Proposed Scheme, which has three components. These are the main line, which is orientated south to north through the area; the Birmingham spur, which is the line that separates from the main line just north of the M6 and continues towards Birmingham City Centre and Curzon Street Station; and the Birmingham north chord, which is the line that joins the Birmingham spur to the main line going north.
- 7.15.4 Birmingham Interchange and Chelmsley Wood (CFA 24) lies to the south; Curdworth to Middleton (CFA 20) lies to the north; and Castle Bromwich and Bromford (CFA 25) lies to the west.

Coleshill Junction (CFA19) assessment methodology

- 7.15.5 Within the Coleshill Junction area, there will be no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore focussed on the construction stage.

Coleshill Junction (CFA19) future baseline issues

Key future baseline issues

- 7.15.6 The key issue in relation to the future baseline in the Coleshill Junction area is the change in highway network flows due to background traffic growth. Some junctions are predicted to be operating over capacity in the future baseline scenario. For assessment purposes it has been assumed that there are no material changes to the highway or public transport networks in the future baseline. It is further assumed that there are no material changes to non-motorised traffic flows.

Land use assumptions

- 7.15.7 Future developments and land use changes are accounted for within the TEMPRO growth calculations. There are no substantial committed developments in proximity to the Proposed Scheme which are considered to require specific adjustment to the TEMPRO forecasts.

Transport supply assumptions

- 7.15.8 No material changes in transport supply are anticipated. It has been assumed that bus and rail services, along with PRoW usage, for future years of assessment will be the same as those currently operating. It is also assumed that no public transport or highway network improvements will be undertaken in the future baseline.

Traffic growth assumptions

- 7.15.9 The 2012/ 2013 baseline traffic flows of the junctions, as described in the baseline conditions section for the Coleshill Junction area, have been uplifted to establish the future baseline conditions for 2021 by applying TEMPRO Growth Rates to existing traffic flows.
- 7.15.10 The TEMPRO Growth rates applied in this area can be found in Table 7-237 and Table 7-238.

Table 7-237: Coleshill Junction TEMPRO growth rates for 2012

Authority	Location	Zone	2012-2021	
			Average Weekday Peaks	
			AM	PM
Warwickshire	North Warwickshire	Coleshill	1.12	1.13
Warwickshire	North Warwickshire	Rural	1.11	1.12

Table 7-238: Coleshill Junction TEMPRO growth rates for 2013

Authority	Location	Zone	2013-2021	
			Average Weekday Peaks	
			AM	PM
Warwickshire	North Warwickshire	Coleshill	1.11	1.12
Warwickshire	North Warwickshire	Rural	1.11	1.1

- 7.15.11 The factors have been derived for the individual road types and relevant wards. The assessment covers the AM and PM peak periods for an average weekday.

Strategic and local road network traffic flows

- 7.15.12 Future baseline traffic flows for motorways in the area are expected to reflect national growth trends from existing flow levels.
- 7.15.13 The directional future baseline traffic flows for local roads in the area which are likely to be affected by traffic changes as a result of the construction of the Proposed Scheme are contained within Table 7-239 and Table 7-240.

Table 7-239: Coleshill Junction local road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A446 Lichfield Road, between south of its jnc with the M6 and north of its jnc with the B4117	NB	701	13%	783	13%	82	12%
	SB	1282	7%	1433	7%	151	12%
B4114 Birmingham Road, between east of River Cole and its jnc with the A446	WB	674	7%	753	7%	79	12%
	EB	566	8%	632	8%	66	12%
B4117 Gilson Road, between its jnc with Gilson Drive and its jnc with the A446	WB	157	4%	175	4%	18	12%
	EB	277	4%	310	4%	33	12%

Table 7-240: Coleshill Junction local road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A446 Lichfield Road, between south of its jnc with the M6 and north of its jnc with the B4117	NB	1185	6%	1337	6%	152	13%
	SB	775	6%	874	6%	99	13%
B4114 Birmingham Road, between east of River Cole and its jnc with the A446	WB	712	5%	803	5%	91	13%
	EB	672	5%	758	5%	86	13%
B4117 Gilson Road, between its jnc with Gilson Drive and its jnc with the A446	WB	365	3%	412	3%	47	13%
	EB	139	1%	157	1%	18	13%

7.15.14 In addition to the links described in the tables above, the following will also be affected by the construction of the Proposed Scheme as a result of traffic flow increases due to construction and mass haul movements. These links are as follows:

- Coleshill Heath Road
- B4117 Watton Lane from A446 to Gypsy Lane
- B4117 Watton Lane to Water Orton

- Gypsy Lane

7.15.15 The junctions within the Coleshill Junction area which have been identified as having potential to be impacted by additional traffic as generated by the construction movements of the Proposed Scheme are as follows:

- Coleshill Heath Road/Yorkminster Drive;
- B4118 Birmingham Road/B4118 Marsh Lane/B4117 Birmingham Road;
- M6/ A446 Stonebridge Road;
- A446 Lichfield Road/B4117 Watton Lane;
- A446 Lichfield Road/B4117 Gilson Road;
- Birmingham Road/B4114 Birmingham Road/A446 Stonebridge Road; and
- A446 Stonebridge Road/Coleshill Heath Road.

7.15.16 Existing traffic flows, through the junctions have been uplifted to establish their future baseline flows to compare with capacities. Table 7-241 to Table 7-243 show the junctions which will operate with flow/capacity values over 85% on one arm or more in the future baseline scenario. The 85% ratio is considered to be the threshold above which the junction is approaching its practical traffic capacity. It should be noted that once the junction reaches capacity (100%), then the predicted queue lengths become less reliable as the modelling software is approaching the limits of its operating range.

Table 7-241: Coleshill Junction area future baseline performance at the B4118 Birmingham Road/B4118 Marsh Lane/B4117 Birmingham Road priority junction

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Birmingham Road (B4118) - West	139	31%	0	363	36%	1
Marsh Lane (B4118)	308	44%	1	342	51%	1
Birmingham Road (B4117) - East	191	19%	0	213	21%	0
17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Birmingham Road (B4118) - West	439	104%	9	492	126%	19
Marsh Lane (B4118)	432	104%	16	483	125%	43
Birmingham Road (B4117) - East	439	49%	1	491	56%	1

Table 7-242: Coleshill Junction area future baseline performance at the A446 Lichfield Road/B4117 Gilson Road roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A446 Lichfield Road	1117	62%	2	1240	70%	2
B4117 Lichfield Road	238	78%	3	265	105%	16
A446 Stonebridge Road	976	47%	1	1084	52%	1
B4117 Gilson Road	261	62%	2	289	76%	3
17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A446 Lichfield Road	914	48%	0.9	1024	55%	1
B4117 Lichfield Road	282	67%	2	316	85%	5
A446 Stonebridge Road	1100	53%	1.1	1232	59%	1
B4117 Gilson Road	135	31%	0	151	39%	1

Table 7-243: Coleshill Junction area future baseline performance at the Birmingham Road/B4114 Birmingham Road/A446 Stonebridge Road roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A446 Stonebridge Road (North)	1369	92%	10	1522	102%	39
B4114 Birmingham Road (East)	674	198%	205	749	244%	389
A446 Stonebridge Road (South)	1080	68%	2	1201	76%	3
B4114 Birmingham Road (West)	692	116%	58	768	140%	126
17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A446 Stonebridge Road (North)	1142	75%	3	1279	83%	5
B4114 Birmingham Road (East)	536	111%	36	599	138%	97
A446 Stonebridge Road (South)	995	63%	2	1116	71%	2
B4114 Birmingham Road (West)	770	130%	102	863	157%	216

Coleshill Junction (CFA19) Proposed Scheme construction description

Construction activities

- 7.15.17 The major construction elements within the study area are as follows:
- Viaducts crossing over the M6, M42, M6-M42 link, and over the Birmingham to Nuneaton railway;
 - Coleshill No2, Green Lane and Marsh Lane Embankments, and Water Orton Cutting; and
 - Birmingham Spur Diveunder.
- 7.15.18 Details of the construction phasing are summarised in Figure 7-22.

Figure 7-22: Coleshill Junction construction activity phasing

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Advance works																																				
Advance works																																				
Civil engineering works																																				
M6 motorway main compound and Temporary Workers Accommodation Site 5																																				
Coleshill no. 1 embankment																																				
Coleshill no. 2 embankment																																				
Coleshill no. 3 embankment																																				
Manor Drive embankment																																				
Gilson cutting																																				
Watton House south embankment																																				
Green Lane embankment																																				
Attleboro Farm embankment																																				
Water Orton cutting																																				
Marsh Lane embankment																																				
MAIN LINE																																				
M6 motorway south viaduct satellite compound																																				
M6 motorway south viaduct																																				
M6 motorway north viaduct (north) satellite compound and M6 motorway north viaduct (south) satellite compound																																				
M6 motorway north viaduct																																				

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Coleshill west viaduct satellite compound																																				
Coleshill west viaduct																																				
Coleshill east viaduct																																				
B4114 Birmingham Road underbridge																																				
Birmingham spur diveunder																																				
Birmingham spur diveunder																																				
M42 Coleshill box structure satellite compound																																				
M42 Coleshill box structure																																				
M42 Coleshill south viaduct																																				
M42 Coleshill north viaduct satellite compound																																				
M42 Coleshill north viaduct																																				
Footpath M62 overbridge																																				
Chattle Hill box structure satellite compound																																				
Chattle Hill box structure																																				
BIRMINGHAM SPUR																																				
Manor Drive/River Cole viaducts satellite compound																																				
River Cole east viaduct																																				
River Cole west viaduct																																				
M42-M6 motorway link viaduct satellite compound (west); M42-M6 motorway link viaduct satellite compound (central); M42-M6 motorway link viaduct satellite compound (east)																																				

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
M42-M6 motorway link east viaduct																																				
M42-M6 motorway link west viaduct																																				
NORTH CHORD																																				
Water Orton viaduct 1 and 3 (central) satellite compound; Water Orton viaduct 1 and 3 (M42 north) satellite compound; Water Orton viaduct 1 and 3 (south) satellite compound; Water Orton viaduct 1 and 3 (M42 south) satellite compound (M42 South)																																				
Water Orton viaduct 1																																				
Water Orton viaduct 3																																				
Water Orton viaduct 4																																				
Water Orton viaduct 5																																				
Attleboro flyover satellite compound																																				
Attleboro flyover																																				
Attleboro Lane overbridge																																				
Rail infrastructure and systems works																																				
Rail installation works (From Kingsbury Road railhead)																																				
Gilson Road ATS satellite compound (163-S1)																																				
Attleboro Package sub-station satellite compound																																				
M-77 Package substation compound																																				
Commissioning																																				

Compounds and construction sites

- 7.15.19 Within the Coleshill Junction area a total of one main and 18 satellite construction compounds will be situated along the alignment of the Proposed Scheme.
- 7.15.20 The locations of the construction compounds are shown in Map CT-05-107 to CT-05-136b (Volume 2, Map Book 19)
- 7.15.21 The forecast size of the construction workforce required for each construction compound has been estimated from the construction activities associated with the design elements assigned to each compound. The peak and average daily workforce for each compound is shown in Table 7-244. Compounds with no workforce numbers are accessed via other compounds; where numbers are given they include all workers utilising that compound.

Table 7-244: Coleshill Junction assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		average	peak
Main	M6 Motorway Main Compound	113	200
Satellite	M6 Motorway South Viaduct Compound	15	15
Satellite	M6 Motorway North Viaduct Compound - (South)	-	-
Satellite	M6 Motorway North Viaduct Compound - (North)	-	-
Satellite	Coleshill Viaduct West Compound	-	-
Satellite	Birmingham Spur Diveunder Compound	-	-
Satellite	M42 Coleshill Box Structure Compound	46	85
Satellite	Re-aligned Manor Drive Compound	-	-

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		average	peak
Satellite	M42 Coleshill North Viaduct Compound	31	50
Satellite	M42-M6 Motorway Link Viaducts (East)	-	-
Satellite	M42 - M6 Motorway Link Viaduct Compound (Central)	30	30
Satellite	M42-M6 Motorway Links Viaducts (West) Compound	-	-
Satellite	Attleboro' Flyover Compound	45	85
Satellite	Water Orton Viaduct 1 and 3 (M42 North) Compound	-	-
Satellite	Water Orton Viaduct 1 and 3 (M42 South) Compound	64	80
Satellite	Water Orton Viaduct 1 and 3 (Central) Compound	79	135
Satellite	Chattle Hill Box Structure Compound	-	-
Satellite	Water Orton Viaduct 1 and 3 (North) Compound	-	-
Satellite	Water Orton Viaduct 1 and 3 (South) Compound	-	-

Construction trip assumptions

Trip generation

7.15.22 Construction vehicle movements required to construct the Proposed Scheme include the delivery of plant and materials, movement of excavated materials and site worker trips to and from construction compounds. Construction routes have been determined based on the best available highway corridors between compounds and the strategic highway network with the aim of minimising impacts on local roads where practicable.

7.15.23 The duration of when there will be busy transport activity at each site is shown in Table 7-245. Some compounds only have traffic movements to other locations within the construction area. The data in Table 7-245 represent the periods when the construction traffic flows will be greater than 50% of the peak flows. Also shown is the estimated number of daily vehicle trips during the peak month of activity, the lower end of the range shows the average number of trips in the busy period and the upper end the peak month flows. The assessment scenario has assumed the peak month for the combination of activities, i.e. not necessarily the peak activity at each individual site.

Table 7-245: Coleshill Junction typical vehicle trip generation for construction site compounds

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Main	M6 Motorway Main Compound	Coleshill Heath Road	July 2018	5	27	255-290	125-185
Satellite	M6 Motorway South Viaduct Compound	Track/haul route via M6 Motorway Main Compound	-	-	-	Few external movements	
Satellite	M6 Motorway North Viaduct Compound (South)	Track/haul route via M6 Motorway Main Compound	-	-	-	Few external movements	
Satellite	M6 Motorway North Viaduct Compound (North)	Track/haul route via M6 Motorway Main Compound	-	-	-	Few external movements	
Satellite	Coleshill Viaduct West Compound	Track/haul route via M6 Motorway Main Compound	-	-	-	Few external movements	
Satellite	Birmingham Spur Diveunder Compound	Track/haul route via M6 Motorway Main Compound	-	-	-	Few external movements	

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	M42 Coleshill Box Structure Compound	Gilson Drive	July 2018	5	20	115-125	85-115
Satellite	Re-aligned Manor Drive Compound	Track/haul route via M42 Coleshill Box Structure Compound	-	-	-	Few external movements	
Satellite	M42 Coleshill North Viaduct Compound	Gilson Drive	July 2018	2.5	19	60-75	60-90
Satellite	M42-M6 Motorway Link Viaducts (East)	Track/haul route via M42 Coleshill North Viaduct Compound	-	-	-	Few external movements	
Satellite	M42-M6 Motorway Link Viaducts Compound (Central)	M6	June 2018	2	23	50	30-45
Satellite	M42-M6 Motorway Link Viaducts (West) Compound	Track/haul route via M42-M6 Motorway Link Viaduct Compound (Central)	-	-	-	Few external movements	
Satellite	Attleboro Flyover Compound	Coleshill Road	July 2018	3.5	14	110-130	90-120
Satellite	Water Orton Viaducts 1 and 3 (M42 North) Compound	B4117 Gilson Road	July 2018	2	21	105-120	60-85
Satellite	Water Orton Viaducts 1 and 3 (M42 South) Compound	Track/haul route via M42-M6 Motorway Link Viaduct Compound (Central)	-	-	-	Few external movements	
Satellite	Water Orton Viaducts 1 and 3 (Central) Compound	A446 Lichfield Road	July 2018	3.5	27	145-195	90-130
Satellite	Chattle Hill Box Structure Compound	Track/haul route via Water Orton Viaduct 1 and 3 (Central) Compound	-	-	-	Few external movements	

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (Months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	Water Orton Viaducts 1 and 3 (North) Compound	Track/haul route via Water Orton Viaduct 1 and 3 (Central) Compound	-	-	-	Few external movements	
Satellite	Water Orton Viaducts 1 and 3 (South) Compound	Track/haul route via Water Orton Viaduct 1 and 3 (Central) Compound	-	-	-	Few external movements	
Road head	RH-159	Coleshill Heath Road	October 2019	2.5	30	-	750
Road head	RH-160	Maintenance slip road via Coleshill Heath Road	February 2020	2.5	30	-	750
Road head	RH-161	B4114 Birmingham Road	August 2018	5.5	63	-	2550
Road head	RH-163	B4117 Gilson Road/A446 Lichfield Road	May 2021	1	10	-	35
Road head	RH-164	A446 Lichfield Road	July 2019	2.5	30	-	1250

7.15.24 The assessment also includes in-combination impacts by taking into account traffic and transport impacts of works being undertaken in neighbouring CFA areas. Construction traffic flows of 170 cars/LGV and 1430 HGV inbound per day and 150 cars/LGV and 1430 HGV per day outbound via the A446 Lichfield Road as generated from CFA20 (Curdworth to Middleton); 30 cars/LGV and 1500 HGV inbound per day and 40 cars/LGV and 1500 HGV per day outbound via the A452 Lancaster Way and M6 as generated from CFA25 (Castle Bromwich and Bromford) and 20 cars/LGV and 1500 HGV inbound per day and 20 cars/LGV and 1500 HGV per day outbound via the A446 Stonebridge Road, the A452 Chester Road and the M42 as generated from CFA24 (Birmingham Interchange and Chelmsley Wood) in the adjacent CFAs have been included in the assessment for this area.

Construction lorry routes

7.15.25 Construction trips will mainly occur along the alignment of the Proposed Scheme, however the construction routes through the area will be as follows:

- A446 Lichfield Road, throughout the area from the A452 Chester Road to approximately 175m north of B4118 Marsh Lane;
- Coleshill Heath Road, between Yorkminster Drive and the A446 Stonebridge

Road;

- B4114 Birmingham Road, between just east of Coleshill Hall Farm and the A446 Lichfield Road;
- Manor Drive, between B4114 Birmingham Road and the Office Campus Coleshill Manor;
- Coleshill Drive, between the M6 Toll overbridge and the B4117 Gilson Road;
- B4117 Gilson Road, between Gilson Drive and the A446 Lichfield Road;
- B4118 Birmingham Road / B4117 Watton Lane, between approximately 230m east of the M6 overbridge and the A446 Lichfield Road;
- Gypsy Lane, between Coleshill Road and the B4117 Gilson Drive;
- B4117 Gilson Road, between the Old Salteians Rugby Football Club; and
- M6, in this area between water Orton Road overbridge and the A446 Stonebridge Road.

7.15.26 The construction routes can be found in Map TR-03-119 (Volume 5, Map Book 71).

Traffic management, road closures and diversions

7.15.27 A number of works will involve restrictions and closures of sections of the M6 and M42. These are further described in Volume 2, Section 2.

7.15.28 In addition to those, it will be necessary to implement traffic management or narrow lane working on the A446 Lichfield Road. This is predicted to result in no substantial impacts to vehicles travelling through the area.

7.15.29 Overnight and/or weekend closures will be required to tie-in new highway diversions of the Proposed Scheme with the existing highways. These temporary closures will occur on the following highways:

- Coleshill Heath Road, between Yorkminster Drive and the A446 Stonebridge Road;
- B4114 Birmingham Road, between River Cole and the A446 Stonebridge Road;
- Manor Drive, between Birmingham Road and Coleshill Manor;
- B4117 Gilson Road, between the village of Gilson and the A446 Lichfield Road; and
- Attleboro Lane, between the M6 and Vicarage Lane.

PRoW closures and diversions

- 7.15.30 In this area no PRoW will be closed during the construction phase of the Proposed Scheme, however one PRoW (M54, Chainage 163+000) will be subject to an approximately 420m diversion.

Avoidance and mitigation

- 7.15.31 The following measures have been included as part of the engineering design of the Proposed Scheme in this area and will avoid or reduce impacts on transport users:
- construction materials and equipment will be transported along the haul road adjacent to the Proposed Scheme alignment where reasonably practicable, to reduce lorry movements on the public highway;
 - the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in limited diversions of traffic onto alternative routes;
 - construction of a new alignment of Manor Drive and its connection to the B4114 Birmingham Road before closure of the existing Manor Drive;
 - the Proposed Scheme includes permanent realignments of eight PRoW and temporary re-routeing as necessary to reduce loss of amenity;
 - road closures will be limited to overnight and/or weekends;
 - hard shoulders will be utilised to compensate for lane closures on motorways;
 - traffic management or narrow lane working will be used to reduce the need for highway closure;
 - HGV routeing along the strategic road network and using designated routes for access;
 - Materials will be transported by rail to reduce the potential numbers of HGV trips that would otherwise be made on the highway network;
 - provision of on-site accommodation and welfare facilities to reduce daily travel by site workers; and
 - the rail possessions will be managed so these take place for limited durations and in such a way that they will have no substantial impact on travellers.
- 7.15.32 The draft Code of Construction Practice (CoCP) (see Volume 5: Appendix CT-003-000) includes measures that seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

- 7.15.33 Where reasonably practicable, the number of private car trips to and from each site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an over-arching framework travel plan⁴ that will require travel plans to be used along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where practicable, particularly in a rural context, this will encourage the use of sustainable modes of transport.
- 7.15.34 The measures in the CoCP will include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific traffic management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, footpaths and other PRow affected by the Proposed Scheme as necessary.
- 7.15.35 Specific measures will include:
- core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will therefore generally arrive before the morning peak hour and depart after the evening peak hour (although the assessment has assumed that some of work journeys to the construction sites take place within the morning and evening peak hours to reflect a reasonable worst case scenario) (draft CoCP, Section 5); and
 - excavated material will be reused wherever reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15).

Coleshill Junction (CFA19) construction impacts

Key construction transport issues

- 7.15.36 This section considers the key transport issues during construction including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.

Strategic and local road network traffic flows

- 7.15.37 A number of works will involve restrictions and closures of sections of the M6 and M42.

⁴ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

- 7.15.38 During the construction of the M6 viaducts 1, 2 and 3, lane closures and restrictions on the M42 Junction 7 slip road, M6 westbound and M6 eastbound will be necessary. These closures are of very short durations and will not individually result in substantial impacts.
- 7.15.39 During the construction of the M42 Coleshill viaduct, the number of lanes on the M42 southbound will be reduced from four to three for a period of 40 days. This is considered to result in a substantial impact.
- 7.15.40 The construction of the M42 Coleshill viaduct will also result in three further closures of the M6-M42 southbound, M42 southbound and M42 northbound for limited night-time and one weekend closure. These are not individually considered substantial.
- 7.15.41 During the construction of the M42-M6 link viaducts 1 and 2 lane closures will be required. This includes weekend closure of M6-M42 and M42-M6 links. These will not individually have a substantial impact.
- 7.15.42 During the construction of Water Orton viaducts 1 and 3, it will be necessary to close sections of M42 northbound and southbound, M42-M6 junction 8 slip road, M6-M42 junction 4a slip road and Gilson Road, each for one or two weekends. These will not individually have substantial impact.
- 7.15.43 However, while the individual road closures are not considered substantial (other than the 40 day reduction in M42 southbound lanes) and generally involve overnight or limited weekend restrictions, taken in combination there will be on-going disruption to the M42 and M6 in this area over an extended period and it is considered that this will be a substantial impact.
- 7.15.44 Construction of the Proposed Scheme is forecast to result in substantial increases in daily traffic flows on certain roads within the Coleshill Junction area as a result of designated construction routes through the area. The links expected to be impacted are summarised in Table 7-246 and Table 7-247.

Table 7-246: Coleshill Junction area construction traffic flows (vehicles) - AM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A446 Lichfield Road, between south of its jnc with the M6 and north of its jnc with the B4117	NB	701	783	963	282	180	180	23%	177%
	SB	1282	1433	1613	281	180	180	13%	179%
B4114 Birmingham Road, between east of River Cole and its jnc with the A446	WB	674	753	984	214	231	161	31%	307%
	EB	566	632	795	210	163	162	26%	337%
B4117 Gilson Road, between its jnc with Gilson Drive and its jnc with the A446	WB	157	175	198	14	23	6	13%	77%
	EB	277	310	317	17	7	6	2%	54%

Table 7-247: Coleshill Junction area construction traffic flows (vehicles) - PM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A446 Lichfield Road, between south of its jnc with the M6 and north of its jnc with the B4117	NB	1185	1337	1517	254	180	180	13%	242%
	SB	775	874	1054	235	180	180	21%	326%
B4114 Birmingham Road, between east of River Cole and its jnc with the A446	WB	712	803	954	193	151	152	19%	374%
	EB	672	758	967	189	209	152	28%	408%
B4117 Gilson Road, between its jnc with Gilson Drive and its jnc with the A446	WB	365	412	414	16	2	2	0%	15%
	EB	139	157	174	4	17	2	11%	89%

7.15.45 Capacities of single carriageway roads depend upon their geometry but a value of 1600 vehicles per hour per lane is specified within the Department for Transport's DMRB Volume 13. In this regard all the links assessed in the above table have forecasted traffic flows, including construction traffic, well within the link capacity for a single carriageway road.

7.15.46 In addition to the links identified above, the following roads will also be impacted by construction traffic as follows for the AM peak hour in 2021

- Coleshill Heath Road with an additional 285 vehicle movements of which 214

are HGVs;

- B₄₁₁₇ Watton Lane from A₄₄₆ to Gypsy Lane with an additional 103 vehicle movements of which 35 are HGVs;
- B₄₁₁₇ Watton Lane to Water Orton with an additional 19 vehicle movements of which 5 are HGVs;
- Gypsy Lane with an additional 84 vehicle movements of which 30 are HGVs;

7.15.47 The increased traffic on these roads results in forecast traffic flow levels well within capacity of a single carriageway road and this quantum of construction traffic is not expected to substantially impact on capacity or congestion.

Junction performance

7.15.48 Junctions within this area have been assessed for the future baseline with construction traffic generated by the Proposed Scheme. Certain junctions within this area are predicted to operate at or over capacity when adding construction traffic to the 2021 future baseline scenario. The results of the junctions which are forecast to have flow/capacity values over 85% are presented in Table 7-248 to Table 7-253.

Table 7-248: Priority junction B₄₁₁₈ Birmingham Road/B₄₁₁₈ Marsh Lane/B₄₁₁₇ Birmingham Road - 2021 Future Baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
Birmingham Road (B ₄₁₁₈) - West	363	36%	1	371	37%	1
Marsh Lane (B ₄₁₁₈)	342	51%	1	344	52%	1
Birmingham Road (B ₄₁₁₇) - East	213	21%	0	237	21%	0
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Birmingham Road (B ₄₁₁₈) - West	492	126%	19	511	128%	20
Marsh Lane (B ₄₁₁₈)	483	125%	43	484	127%	45
Birmingham Road (B ₄₁₁₇) - East	491	56%	1	497	56%	1

7.15.49 The modelling results demonstrate that the Birmingham Road / Marsh Lane junction operates over capacity in the PM peak hour in the 2021 baseline scenario. Construction traffic will increase queues and delays at this junction but the overall impact of the Proposed Scheme on congestion levels at this junction is minimal.

Table 7-249: Roundabout M6/A446 Stonebridge Road - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A446 north	1358	83%	5	1926	119%	145
M6 east	734	74%	3	821	99%	17
A446 south	607	30%	0	1121	58%	1
M6 west	1137	72%	3	1358	105%	43
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A446 north	1178	71%	2	1806	111%	92
M6 east	467	38%	1	479	48%	1
A446 south	834	42%	1	1348	70%	2
M6 west	921	63%	2	1067	88%	7

7.15.50 The modelling results demonstrate that the M6/A446 Stonebridge Road junction is approaching its practical traffic capacity during the AM peak in the 2021 baseline. Construction traffic will increase queues and delays at the junction. The queuing though is likely to be overstated since the modelling software is beyond the limits of its operating range, as the junction exceeds its theoretical capacity. Measures to control peak hour construction flows are included in the draft CoCP and it is expected these will be used to ensure that overall levels of congestion are maintained at acceptable levels during construction of the Proposed Scheme.

Table 7-250: Signalised junction A446 Lichfield Road/B5177 Watton Lane - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A446 Lichfield Road (north)	1207	39%	5	1385	46%	6
A446 Lichfield Road (south)	906	62%	12	956	66%	13
B5177 Watton Lane (west)	210	62%	6	239	71%	7

17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A446 Lichfield Road (north)	843	53%	3	953	79%	5
A446 Lichfield Road (south)	1267	79%	24	1376	88%	34
B5177 Watton Lane (west)	160	69%	6	213	79%	9

7.15.51 The modelling results demonstrate that the Proposed Scheme has a minimal impact on the capacity of the A446 Lichfield Road/B4117 Gilson Road junction.

Table 7-251: Roundabout A446 Lichfield Road/B4117 Gilson Road - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A446 Lichfield Road	1240	70%	2	1429	81%	4
B4117 Lichfield Road	265	105%	16	265	160%	53
A446 Stonebridge Road	1084	52%	1	1303	62%	2
B4117 Gilson Road	289	76%	3	302	98%	11
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A446 Lichfield Road	1024	55%	1	1214	66%	2
B4117 Lichfield Road	316	85%	5	316	112%	24
A446 Stonebridge Road	1232	59%	1	1426	68%	2
B4117 Gilson Road	151	39%	1	170	55%	1

7.15.52 The modelling results demonstrate that the A446 Lichfield Road/B4117 Gilson Road junction operates over capacity on one arm in the peak hours in the 2021 baseline scenario. Construction traffic will increase queues and delays on this arm but the overall impact on congestion levels at this junction is unlikely to be substantial.

Table 7-252: Roundabout Birmingham Road/B4114 Birmingham Road/A446 Stonebridge Road - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A446 Stonebridge Road (North)	1522	102%	39	1775	118%	143
B4114 Birmingham Road (East)	749	244%	389	749	265%	360
A446 Stonebridge Road (South)	1201	76%	3	1577	100%	28
B4114 Birmingham Road (West)	768	140%	126	1095	219%	358
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A446 Stonebridge Road (North)	1279	83%	5	1538	99%	25
B4114 Birmingham Road (East)	599	138%	97	599	192%	181
A446 Stonebridge Road (South)	1116	71%	2	1427	92%	10
B4114 Birmingham Road (West)	863	157%	216	1204	234%	449

7.15.53 The modelling results demonstrate that the Birmingham Road/B4114 Birmingham Road/A446 Stonebridge Road junction is predicted to be operating over capacity in the peak hours in the 2021 baseline scenario. However the queues reported are likely to be overestimated as the analysis assumes background traffic growth is unconstrained, which is unlikely to be the case on a congested highway network. Construction traffic will increase queues and delays at the junction although these are likely to be overstated due to the over estimating of congestion impacts in the future baseline. Measures to control peak hour construction flows are included in the draft CoCP and it is expected these will be used to ensure that overall levels of congestion are maintained at acceptable levels during construction of the Proposed Scheme.

Table 7-253: Roundabout A446 Stonebridge Road/Coleshill Heath Road - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A446 Stonebridge Road Southbound	1854	82%	5	2192	101%	37
A446 Stonebridge Road Northbound	1502	48%	1	2166	70%	2
Coleshill Heath Road	585	71%	2	801	120%	65

17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A446 Stonebridge Road Southbound	1269	56%	1	1627	75%	3
A446 Stonebridge Road Northbound	1631	49%	1	2142	64%	2
Coleshill Heath Road	574	71%	2	830	123%	81

7.15.54 The modelling results demonstrate that the A446/Coleshill Road junction is approaching its practical traffic capacity during the AM peak in the 2021 baseline. Construction traffic will increase queues and delays at the junction. The queueing though is likely to be overstated since the modelling software is approaching the limits of its operating range, as the junction approaches its theoretical capacity. Measures to control peak hour construction flows are included in the draft CoCP and it is expected these will be used to ensure that overall levels of congestion are maintained at acceptable levels during construction of the Proposed Scheme.

7.15.55 In addition to the junctions identified above, the following junctions will be affected by small volumes of construction traffic in peak hours 2021.

- B4117 Watton Lane/Gypsy Lane with up to 103 additional vehicles per hour including 35 HGVs;
- B4117 Gilson Road Gilson Drive with up to 30 additional vehicles per hour including 12 HGVs;
- B4114 Birmingham Road / Manor Drive with up to 394 additional vehicles per hour including 323 HGVs;

7.15.56 These additional flows are not expected to lead to substantial impacts in terms of the capacity of the junctions or congestion impacts.

7.15.57 Overnight and/or weekend road closures will be required to tie-in new highway realignments with the existing highways. These temporary closures will occur on the following highways:

- Coleshill Heath Road, between Yorkminster Drive and the A446 Stonebridge Road;
- B4114 Birmingham Road, between River Cole and the A446 Stonebridge Road;
- Manor Drive, between Birmingham Road and Coleshill Manor;
- B4117 Gilson Road, between the village of Gilson and the A446 Lichfield Road; and
- Attleboro Lane, between the M6 and Vicarage Lane.

7.15.58 These off peak closures will not have a substantial impact on road users.

- 7.15.59 Highway realignments in this area will result in changes in journey length. These changes will be permanent and are reported later in Proposed Scheme operation.

Accidents and safety

- 7.15.60 No substantial accident clusters have been identified on routes used by construction traffic of the Proposed Scheme within the Coleshill Junction area; construction traffic is not expected to substantially affect accident rates.

Rail

- 7.15.61 Civil engineering works to construct the Birmingham Interchange will necessitate temporary track possessions affecting rail users passing through the Coleshill Junction area. Track possessions will be limited to four separate mid-week night time possessions of 4 hour duration each. The impact of these works on rail passengers will not be substantial.

Local bus and coach

- 7.15.62 It is not expected that the construction of the Proposed Scheme will require any bus route diversions, as road closures are only proposed overnight when bus services will not be operational.

Pedestrians, cyclists and equestrians

- 7.15.63 The main issues anticipated to arise as a result of the construction of the Proposed Scheme within the Coleshill Junction area will be temporary diversions of PRoW.
- 7.15.64 A total of eight PRoW will be permanently realigned in this area and are discussed in the operation section. One of the eight affected PRoW will be temporarily diverted during the construction phase of the Proposed Scheme. Table 7-254 lists the PRoW subject to a temporary diversion, their diversion length and increase in journey time.

Table 7-254: PRoW diversion in CFA19

PRoW	Chainage	Diversion Length	Journey time increase
M54	163+000	420m	5min

- 7.15.65 The above diversions will be of a minor length and affect low numbers of users (less than 10 users per day). Therefore it is considered that these changes will not adversely impact non-motorised users.
- 7.15.66 Note that impacts arising from permanent PRoW realignments are reported in the operations section below.

Waterways and canals

- 7.15.67 No navigable waterways will be affected by the construction of the Proposed Scheme within this area.

Coleshill Junction (CFA19) Proposed Scheme operation description

Operation trip assumptions

Trip generation

- 7.15.68 During the operational phase of the Proposed Scheme only occasional trips will have to be made for maintenance purposes. These infrequent vehicle movements will be very low and will have no material impact on the operation of any junctions or highways within the study area.
- 7.15.69 Additional trips through the study area will be generated from the Birmingham Interchange station. It is estimated that 160 two-way daily trips will use the A446 Lichfield Road within the Coleshill Junction area. This low number in additional trips will have no substantial impact on motorised or non-motorised users.

Avoidance and mitigation measures

- 7.15.70 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads crossing the Proposed Scheme in, or very close to their current location, resulting in no substantial diversions of traffic onto alternative routes; and
 - retaining PRoW crossing the Proposed Scheme, with any realignments kept to a minimum where reasonably practicable.

Coleshill Junction (CFA19) operation impacts

Key operation transport issues

- 7.15.71 This section considers the key transport issues during operations including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.
- 7.15.72 As previously set out, within the Coleshill Junction area, there will be no material traffic generation resulting from the operation of the Proposed Scheme. However, there will be limited increases in traffic due to access journeys to Birmingham Interchange station in the neighbouring Birmingham Interchange and Chelmsley Wood area (CFA24), but these will have no substantial impact. Impacts associated with changes in traffic flow are therefore not considered further in this section.

- 7.15.73 This section considers the impacts on traffic and transport and the consequential impacts resulting from the operational phase of the Proposed Scheme.

Strategic and local road network traffic flows

- 7.15.74 There will be no impact on the operation of motorways within the study area.
- 7.15.75 The construction of a new road alignment for Manor Drive and the replacement of the B4114 Birmingham Road/Manor Drive roundabout with a priority junction to the south-west of the existing roundabout will be necessary. However, this realignment will have no substantial impact on road users in the study area.
- 7.15.76 A total of six roads will be realigned within this area. Table 7-255 illustrates the change in length of each highway. Negative values demonstrate a shortening of the highway compared to its original alignment.

Table 7-255: Coleshill Junction highway realignments

Highway	Diversion Length
Coleshill Heath Road	No change in length (introduction of new road underpass)
B4114 Birmingham Road	-10m
Manor Drive	430m
B4117 Gilson Road	470m
Attleboro Lane	430m
Water Orton Road	No change in length (extension of road overbridge to span over the Proposed Scheme)

- 7.15.77 The maximum increase in journey length of 470m equates to a journey time of approximately 6 minutes for pedestrians and significantly less for motorised traffic. This level of change will not substantially impact on transport users within this area.
- 7.15.78 In addition to the permanent road realignments, part of Gilson Drive will be subject to a permanent closure. Traffic will be permanently diverted by approximately 3.5km onto the A446 Stonebridge Road, B4114 Birmingham Road and Manor Drive. Due to the low number of users of Gilson Drive, there will be no substantial impact on road users.
- 7.15.79 Overall, average travel times and journey time delays for vehicles through the area will also be similar to those forecasted without the Proposed Scheme in both 2026 and 2041.

Accidents and safety

- 7.15.80 The impact on accidents and safety will be negligible as there are no locations where there are existing highway safety issues or any material increases in traffic due to the operation of the Proposed Scheme.

Rail

- 7.15.81 During the operational phase no local or national rail services will be impacted by the Proposed Scheme.

Local bus and coach

- 7.15.82 The Proposed Scheme will have no substantial impact on bus services which will cross the alignment of the Proposed Scheme. Bus services using the B4117 Gilson Road will be subject to a 470m increase in journey length. Changes of this magnitude will not materially affect overall journey times or delays for public transport users.
- 7.15.83 Bus services using Coleshill Heath Road and the A446 Lichfield Road will experience no change in journey times.

Pedestrians, cyclists and equestrians

- 7.15.84 A total of eight PRoW be will realigned within this area. Of these, two PRoW (M76, 161+400 and M54, 163+000) will be realigned by less than 100m and thus will have no substantial affect on pedestrians, cyclists and equestrians.
- 7.15.85 The Proposed Scheme will have a small impact on four PRoW (M77, 160+730; M56, 163+000; M62, 163+400 and M60, 163+450). The maximum realignment of those will be approximately 290m (M60), which will result in a maximum journey time increase of 4 minutes, since M60 will be closed and users will be realigned via the realigned Footpath M62.
- 7.15.86 The maximum realignment of a PRoW in this area will be approximately 500m (M43, 164+080). Non-motorised users of this PRoW will be subject to a journey time increase of 6 minutes, since M43 will be closed and users will be redirected via the realigned Attleboro Lane.
- 7.15.87 A further one PRoW (M58, 162+120) will be shortened in length by 350m resulting in journey time reductions of 4 minutes.
- 7.15.88 Therefore it is considered that these changes will not substantially adversely impact existing pedestrians, cyclist or equestrians.

Waterways and canals

- 7.15.89 Within this area there are no navigable waterways which could be affected by the operation of the Proposed Scheme.

7.16 Curdworth and Middleton (CFA20)

Curdworth and Middleton (CFA20) Proposed Scheme description

- 7.16.2 The Curdworth to Middleton area covers a 7.8km section of the Proposed Scheme in the borough of North Warwickshire, where it passes to the north-east of the Birmingham urban area. The southern boundary of the area is defined by the River Tame, near Coleshill Parkway and the boundary between Warwickshire and Staffordshire represents its northern limit. The area includes all or part of the parishes of Curdworth, Lea Marston, Wishaw, Kingsbury and Middleton.
- 7.16.3 Coleshill Junction CFA (CFA 19) lies to the south, whilst the Drayton Bassett, Hints and Weeford CFA (CFA 21) is to the north.

Curdworth and Middleton (CFA20) assessment methodology

- 7.16.4 Within the Curdworth to Middleton area, there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore focussed on the construction stage.

Curdworth and Middleton (CFA20) future baseline

Key future baseline issues

- 7.16.5 The key issue in relation to the future baseline in the Curdworth to Middleton area is the change in highway network flows due to background traffic growth. Some junctions are predicted to be operating over capacity in the future baseline scenario. For assessment purposes it has been assumed that there are no material changes to the highway or public transport networks in the future baseline. It is further assumed that there are no material changes to non-motorised traffic flows.

Land Use Assumptions

- 7.16.6 Future developments and land use changes are accounted for within the TEMPRO growth calculations. There are no substantial committed developments in proximity to the Proposed Scheme which are considered to require specific adjustment to the TEMPRO forecasts.

Transport supply assumptions

- 7.16.7 No material changes in transport supply are anticipated. It has been assumed that bus and rail services, along with PRoW usage, for future years of assessment will be the same as those currently operating. It is also assumed that no public transport or highway network improvements will be undertaken in the future baseline.

Traffic growth assumptions

- 7.16.8 The baseline traffic flows of the four junctions, as described in the baseline conditions section for the Curdworth to Middleton area, have been uplifted to establish the future baseline conditions for 2021 by applying TEMPRO Growth Rates to existing traffic flows.
- 7.16.9 The TEMPRO Growth rates applied in this area can be found in Table 7-256 and Table 7-257.

Table 7-256: Curdworth and Middleton TEMPRO growth rates for 2012

Authority	Location	Zone	2012-2021	
			Average Weekday Peaks	
			AM	PM
Warwickshire	North Warwickshire	Water Orton	1.1	1.1
Warwickshire	North Warwickshire	Rural	1.1	1.1

Table 7-257: Curdworth and Middleton TEMPRO growth rates for 2013

Authority	Location	Zone	2013-2021	
			Average Weekday Peaks	
			AM	PM
Warwickshire	North Warwickshire	Water Orton	1.1	1.1
Warwickshire	North Warwickshire	Rural	1.1	1.1

- 7.16.10 The factors have been derived for the individual road types and relevant wards. The assessment covers the AM and PM peak periods for an average weekday.

Strategic and local road network traffic flows

- 7.16.11 Future baseline traffic flows for motorways in the area are expected to reflect national growth trends from existing flow levels.
- 7.16.12 The directional future baseline traffic flows for local roads in the area which are likely to be affected by traffic changes as a result of the construction of the Proposed Scheme are contained within Table 7-258 and Table 7-259.

Table 7-258: Curdworth and Middleton local road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A446 South of Faraday Avenue	NB	898	135	987	148	89	10%
	SB	1257	70	1382	77	125	10%
Faraday Avenue, between A446 and Edison Road	WB	664	130	730	143	66	10%
	EB	289	116	318	128	29	10%
A4097 Kingsbury Road, between M42 and the Reindeer Park Lodge access road	EB	809	80	901	89	92	11%
	WB	323	62	360	69	37	11%
A4091 Tamworth Road, between the A446 and Church Lane	NB	284	31	316	35	32	11%
	SB	599	43	667	48	68	11%
Church Lane, between Walker's Spinney and A4091	WB	42	3	47	3	5	11%
	SB	30	4	33	4	3	11%
A446 North of A4091	EB	906	120	1009	134	103	11%
	WB	990	133	1103	148	113	11%

Table 7-259: Curdworth to Middleton local road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A446 South of Faraday Avenue	NB	1116	103	1227	113	111	10%
	SB	784	42	862	46	78	10%
Faraday Avenue, between A446 and Edison Road	WB	475	116	524	128	49	10%
	EB	754	86	831	95	77	10%
A4097 Kingsbury Road, between M42 and the Reindeer Park Lodge access road	EB	382	41	428	46	46	12%
	WB	831	49	932	55	101	12%

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A4091 Tamworth Road, between the A446 and Church Lane	NB	633	32	710	36	77	12%
	SB	428	25	480	28	52	12%
Church Lane, between Walker's Spinney and A4091	WB	36	1	40	1	4	12%
	SB	46	1	52	1	6	12%
A446 North of A4091	EB	1113	76	1240	85	127	11%
	WB	767	61	854	68	87	11%

7.16.13 The junctions within the Curdworth to Middleton area, which have been identified as having potential to be impacted by additional traffic as generated by the construction movements of the Proposed Scheme are as follows:

- A446 Lichfield Road/Faraday Avenue/Marsh Lane;
- A446 Lichfield Road/A4097 Kingsbury Road/M42;
- A4091/Park Lane; and
- A4091/A446 Lichfield Road.

7.16.14 Existing traffic flows, through the junctions have been uplifted to establish their future baseline flows to compare with capacities. Table 7-260 and Table 7-261 show the junctions which will operate with flow/capacity values over 85% on one arm or more.

Table 7-260: Curdworth and Middleton area future baseline performance at the A446 Lichfield Road/A4097 Kingsbury Road/M42 signalised roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
M42 (N)	481	44%	8	536	50%	8
A4097 (Kingsbury Road)(E)	643	58%	10	716	65%	12
A446 (Lichfield Road)(S)	752	82%	14	834	91%	18
M42 (S)	1246	71%	20	1388	73%	22
A4097 (Kingsbury Road)(W)	674	73%	12	750	82%	14
A446 (Lichfield Road)(N)	1339	75%	21	1492	84%	25

17:00-18:00	2013			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
M42 (N)	293	27%	4	328	30%	5
A4097 (Kingsbury Road)(E)	350	32%	5	393	36%	6
A446 (Lichfield Road)(S)	1343	88%	24	1506	92%	29
M42 (S)	2011	87%	35	2254	92%	41
A4097 (Kingsbury Road)(W)	684	74%	12	768	83%	14
A446 (Lichfield Road)(N)	771	74%	13	864	83%	16

Table 7-261: Curdworth to Middleton area future baseline performance at the A4091 Tamworth Road/A446 Lichfield Road roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A4091	581	50%	1	642	59%	1
A446 Lichfield Road South (NB)	1158	62%	2	1278	69%	2
M6 Toll	123	10%	0	135	11%	0
A446 Lichfield Road North (SB)	1127	73%	3	1244	81%	4

17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A4091	291	21%	0	321	24%	0
A446 Lichfield Road South (NB)	2226	117%	130	1687	89%	8
M6 Toll	44	5%	0	51	5%	0
A446 Lichfield Road North (SB)	829	54%	1	915	62%	2

Curdworth and Middleton (CFA20) Proposed Scheme construction description

Construction activities

7.16.15 The major construction elements within the study area are as follows:

- Faraday Avenue, North Wood and Trickleby Coppice Embankments, and

Curdworth, and Middleton Pool Cuttings;

- M42 Marston Box Structure;
- Faraday Avenue Underbridge and A4091 Tamworth Road Overbridge; and
- Kingsbury Road railhead.

7.16.16 Details of the construction phasing are summarised in Figure 7-23.

Figure 7-23: Cudworth and Middleton construction activity phasing

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters				2026 quarters				2027 quarters											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4												
Advance works																																																				
Advance works																																																				
Civil engineering works																																																				
Curdworth viaduct (south, central, north) satellite compounds																																																				
River Tame west viaduct																																																				
Curdworth viaduct																																																				
A4097 Kingsbury Road overbridge main compound																																																				
Faraday Avenue embankment																																																				
Curdworth cutting																																																				
Leeds spur diveunder																																																				
Kingsbury Road railhead site excavation																																																				
Dunton Wood embankment																																																				
Faraday Avenue underbridge satellite compound																																																				
Faraday Avenue underbridge																																																				
Footpath M16 accommodation overbridge																																																				
A4097 Kingsbury Road overbridge satellite compound																																																				

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters				2026 quarters				2027 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
A4097 Kingsbury Road overbridge																																												
Birmingham and Fazeley Canal viaduct (south, central, north) satellite compounds																																												
Birmingham and Fazeley Canal viaduct																																												
M42 Marston box structure																																												
Cuttle Mill underbridge satellite compound																																												
Cuttle Mill underbridge																																												
North Wood underbridge																																												
North Wood embankment																																												
Primrose culvert satellite compound																																												
Primrose culvert																																												
Hunts Green underbridge																																												
Bodymoor Heath Lane overbridge satellite compound																																												
Bodymoor Heath Lane overbridge																																												
Middleton Pool cutting																																												
Middleton Pool embankment																																												
A4091 Tamworth Road overbridge satellite compound																																												

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters				2026 quarters				2027 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
A4091 Tamworth Road overbridge																																												
Langley Brook viaduct																																												
Church Lane overbridge satellite compound																																												
Church Lane overbridge																																												
Church Lane embankment																																												
Park Lane realignment																																												
Coppice Lane cutting																																												
Trickley Coppice embankment																																												
Footpath T15 accommodation overbridge																																												
Seeney Lane overbridge satellite compound																																												
Rail infrastructure and system works																																												
Kingsbury Road railhead																																												
Operational railhead																																												
Cuttle Mill midpoint auto-transformer station																																												
Faraday Avenue substation																																												
Commissioning																																												
Commissioning (year prior to opening)																																												

Compounds and construction sites

- 7.16.17 Within the Curdworth to Middleton area a total of one main and 16 satellite construction compounds will be situated along the alignment of the Proposed Scheme, in addition to these there will be one Road head within this area, used as access point on to the highway network for the movement of excavated material.
- 7.16.18 After the construction phase is complete and the main compound at Kingsbury Road is no longer required its use will change to that of a Rail head, traffic flows associated with this are unlikely to coincide with any other construction trips within Curdworth to Middleton.
- 7.16.19 The forecast size of the construction workforce required for each construction compound has been estimated from the construction activities associated with the design elements assigned to each compound. The peak and average daily workforce for each compound is shown in Table 7-205. Compounds with no workforce numbers are accessed via other compounds; where numbers are given they include all workers utilising that compound.

Table 7-262: Curdworth and Middleton assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		average	peak
Satellite	Curdworth viaduct (south)	-	-
Satellite	Curdworth viaduct (central)	57	95
Satellite	Curdworth viaduct (north)	50	50
Satellite	Faraday Avenue underbridge	40	50
Satellite	Faraday Avenue Package Substation	-	-
Main	A4097 Kingsbury Road overbridge	128	180
Satellite	A4097 Kingsbury Road overbridge	-	-
Railhead/main compound	Kingsbury Road railhead	190	510

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
Satellite	Seeney Lane overbridge compound	-	-
Satellite	Birmingham & Fazeley Canal viaduct (south)	-	-
Satellite	Birmingham & Fazeley Canal viaduct (central)	-	-
Satellite	Birmingham & Fazeley Canal viaduct (north)	-	-
Satellite	Cuttle Mill mid-point auto-transformer station (MPATS)	-	-
Satellite	Cuttle Mill underbridge	35	50
Satellite	Primrose culvert	-	-
Satellite	Bodysmoor Heath Lane overbridge	29	50
Satellite	A4091 Tamworth Road overbridge	30	30
Satellite	Church Lane overbridge	36	55
Road head	Faraday Avenue	10	10

Construction Trip assumptions

Trip generation

- 7.16.20 Construction vehicle movements required to construct the Proposed Scheme include the delivery of plant and materials, movement of excavated materials and site worker trips to and from construction compounds. Construction routes have been determined based on the best available highway corridors between compounds and the strategic highway network with the aim of minimising impacts on local roads where practicable.

- 7.16.21 The duration of when there will be busy transport activity at each site is shown in Table 7-263. Some compounds only have traffic movements to other locations within the construction area. The data in Table 7-263 represent the periods when the construction traffic flows will be greater than 50% of the peak flows. Also shown is the estimated number of daily vehicle trips during the peak month of activity, the lower end of the range shows the average number of trips in the busy period and the upper end the peak month flows. The assessment scenario has assumed that the peak month of operation for each site occurs at the same time, therefore the assessment is based on a worst case scenario.

Table 7-263: Curdworth and Middleton typical vehicle trip generation for construction site compounds

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	Curdworth viaduct (south)	Track/haul route via Water Orton viaducts 1 & 3 (north) compound (CFA19)	2019	2.5	-	Few external movements	
Satellite	Curdworth viaduct (central)	Edison Road/Faraday Avenue/A446 Lichfield Road	2019	2.5	8	120-140	70-85
Satellite	Curdworth viaduct (north)	Faraday Avenue / A446 Lichfield Road	2019	2.5	-	Few external movements	
Satellite	Faraday Avenue underbridge	Faraday Avenue / A446 Lichfield Road	2018	1.5	-	70-80	30-60
Satellite	Faraday Avenue Package Substation	Faraday Avenue / A446 Lichfield Road	2022	<1	1	Few external movements	
Main	A4097 Kingsbury Road overbridge	A4097 Kingsbury Road	2018	5	19	225-260	125-165
Satellite	A4097 Kingsbury Road overbridge	Track/haul route via A4097 Kingsbury Road main compound	2018	1.5	-	Few external movements	
Railhead/main compound	Kingsbury Road railhead	A4097 Kingsbury Road	2023	4	5	400- 465	10

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	Seeney Lane overbridge compound	Track/haul route via A4097 Kingsbury Road main compound	2018	1	-	Few external movements	
Satellite	Birmingham & Fazeley Canal viaduct (south)	Track/haul route via A4097 Kingsbury Road main compound	2018	3	-	Few external movements	
Satellite	Birmingham & Fazeley Canal viaduct (central)	Track/haul route to A446 Lichfield Road	2018	3	-	Few external movements	
Satellite	Birmingham & Fazeley Canal Viaduct (North)	Track/haul route to Cuttle Mill underbridge satellite compound	2018	3	-	Few external movements	
Satellite	Cuttle Mill mid-point auto-transformer station (MPATS)	Track/haul route to Cuttle Mill Lane/A4091 Tamworth Road/A446 Lichfield Road	2022	1.5	1	<10	<5
Satellite	Cuttle Mill underbridge	A4091 Tamworth Road	2018	3	11	65-75	50-70
Satellite	Primrose culvert	Track/haul route to Cuttle Mill underbridge satellite compound	2019	1	-	Few external movements	
Satellite	Bodysmoor Heath Lane overbridge	Brick Kiln Lane/A4091 Tamworth Road/A446 Lichfield Road	2018	4	10	55-75	45-65
Satellite	A4091 Tamworth Road overbridge	Park Lane	2017	3	-	45-50	25-50
Satellite	Church Lane overbridge	Church Lane	2018	4.5	11	70 - 85	55 - 70
Road head	Faraday Avenue	Faraday Avenue/A446 Lichfield Road	2019	4.5	54	-	1170

- 7.16.22 Trip generation from the construction works being undertaken in neighbouring CFAs has also been included in this assessment. Construction traffic flows of 150 cars/LGV and 1430 HGV per day inbound and 170 cars/LGV and 1430 HGV per day outbound via the A446 Lichfield Road as generated from CFA19 (Coleshill Junction) and 90 cars/LGV and 300 HGV per day inbound and 100 cars/LGV and 300 HGV per day outbound via the A446 London Road as generated from CFA21 (Stoneleigh, Kenilworth and Burton Green) in the adjacent CFAs have been included in the assessment for this area.

Construction lorry routes

- 7.16.23 Construction trips will mainly occur along the alignment of the Proposed Scheme, however the main construction routes through the area will be as follows:
- A446 Lichfield Road, throughout the study area between approximately 180m north of the B4118 Marsh Lane and immediately south of the A453 Carroway Head Hill;
 - Faraday Avenue, between the A446 Lichfield Road and Edison Road;
 - Edison Road, from Faraday Avenue for approximately 330m;
 - A4097 Kingsbury Road, from the M42 for approximately 320m;
 - A4091 Tamworth Road, between the A446 Lichfield Road and Church Lane;
 - Church Lane, between Cromberry Lane and the A4091 Tamworth Road.

- 7.16.24 The construction routes can be found in Map TR-03-120.

Traffic management, road closures and diversions

- 7.16.25 The construction of the M42 Marston box structure will involve restrictions and closures of sections of the M42. These are further described in paragraph 7.16.35.
- 7.16.26 Overnight and/or weekend closures will be required to tie-in new highway diversions of the Proposed Scheme with the existing highways. These temporary closures will occur on the following highways:
- Faraday Avenue, between A446 Lichfield Road and Edison Road;
 - A4097 Kingsbury Road, between the M42 and Blackgraves Lane;
 - Bodymoor Heath Lane, between the A4091 Tamworth Road and the village of Bodymoor Heath;
 - A4091 Tamworth Road, between Brick Kiln Lane and Church Lane;

- Crowberry Lane, between Park Lane and Church Lane;
- Park Lane, between Wishaw Lane and the A4091 Tamworth Road; and
- Church Lane, between Crowberry Lane and the A4091 Tamworth Road.

PRoW closures and diversions

- 7.16.27 In this area no PRoW will be closed during the construction phase of the Proposed Scheme, however three PRoW (T15, 172+080; T17, 170+360 and M23a, 168+250) will be subject to temporary diversions of up to 100m.

Avoidance and mitigation

- 7.16.28 The following measures have been included as part of the engineering design of the Proposed Scheme in this area and will avoid or reduce impacts on transport users:
- construction materials and equipment will be transported along the haul road adjacent to the Proposed Scheme alignment where reasonably practicable, to reduce lorry movements on the public highway;
 - the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in limited diversions of traffic onto alternative routes;
 - the Proposed Scheme includes permanent realignments of PRoW and temporary re-routeing as necessary to reduce loss of amenity;
 - road closures will be limited to overnight and/or weekends;
 - restricted access and traffic management arrangements will be in place on the M42 to avoid day time closure;
 - HGV route along the strategic road network and use designated routes for access as shown in map TR-03-120 (Volume 5, Map Book, Traffic and Transport);
 - materials will be transported by rail, where practicable, to reduce the potential numbers of HGV trips that would otherwise be made on the highway network; and
 - provision of on-site accommodation and welfare facilities to reduce daily travel by site workers.
- 7.16.29 The draft Code of Construction Practice (CoCP) (see Volume 5: Appendix CT-003-000) includes measures that seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

- 7.16.30 Where reasonably practicable, the number of private car trips to and from each site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an over-arching framework travel plan⁵ that will require travel plans to be used along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where practicable, particularly in a rural context, this will encourage the use of sustainable modes of transport.
- 7.16.31 The measures in the CoCP will include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific traffic management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, footpaths and other PRow affected by the Proposed Scheme as necessary.
- 7.16.32 Specific measures will include:
- core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will therefore generally arrive before the AM peak hour and depart after the PM peak hour (although the assessment has assumed that some of work journeys to the construction sites take place within the AM and PM peak hours to reflect a reasonable worst case scenario) (draft CoCP, Section 5); and
 - excavated material will be reused wherever reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15).

Curdworth and Middleton (CFA20) construction impacts

Key construction transport issues

- 7.16.33 This section considers the key transport issues during construction including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.

Strategic and local road network traffic flows

- 7.16.34 Construction traffic will be routed along both the M6 Toll Road and the M42 to access the area. The additional traffic flows are not expected to have a material impact on the capacity of the motorway network.

⁵ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

- 7.16.35 During the construction of the M42 Marston box structure, the number of lanes on the M42 will be maintained with the exception of a small number of overnight carriageway closures which include five night-time closures of the southbound carriageway for installation of the deck over that carriageway; and four night-time closures of the northbound carriageway for installation of the deck over that carriageway.
- 7.16.36 These closures will be of a short duration and are not considered to be substantial.
- 7.16.37 Construction of the Proposed Scheme is forecast to result in substantial increases in daily traffic flows on certain roads within the Cuddington to Middleton area as a result of designated construction routes through the area. The links expected to be impacted are summarised in Table 7-264 and Table 7-265.

Table 7-264: Curdworth and Middleton area construction traffic flows (vehicles) - AM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A446 South of Farady Avenue	NB	898	987	1170	330	183	182	19%	123%
	SB	1257	1382	1705	272	323	195	23%	253%
A446 North of A4091	WB	664	730	740	152	10	9	1%	6%
	EB	289	318	357	137	39	9	12%	7%
Faraday Avenue, between A446 and Edison Road	EB	809	901	970	102	69	13	8%	15%
	WB	323	360	373	81	13	12	4%	17%
A4097 Kingsbury Road, between M42 and the Reindeer Park Lodge access road	NB	284	316	352	44	36	9	11%	26%
	SB	599	667	677	57	10	9	1%	19%
A4091 Tamworth Road, between the A446 and Church Lane	WB	42	47	70	8	23	5	49%	150%
	SB	30	33	39	9	6	5	18%	112%
Church Lane, between Walker's Spinney and A4091	EB	906	1009	1028	150	19	16	2%	12%
	WB	990	1103	1180	188	77	40	7%	27%

Table 7-265: Curdworth and Middleton area construction traffic flows (vehicles) - PM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A446 South of Farady Avenue	NB	1116	1227	1453	283	226	170	18%	150%
	SB	784	862	1038	222	176	176	20%	381%
A446 North of A4091	WB	475	524	553	131	29	3	6%	2%
	EB	754	831	834	98	3	3	0%	3%
Faraday Avenue, between A446 and Edison Road	EB	382	428	432	50	4	4	1%	9%
	WB	831	932	984	59	52	4	6%	7%
A4097 Kingsbury Road, between M42 and the Reindeer Park Lodge access road	NB	633	710	713	40	3	4	0%	11%
	SB	428	480	506	31	26	3	5%	11%
A4091 Tamworth Road, between the A446 and Church Lane	WB	36	40	42	3	2	2	5%	178%
	SB	46	52	69	2	17	1	33%	89%
Church Lane, between Walker's Spinney and A4091	EB	1113	1240	1299	114	59	29	5%	34%
	WB	767	854	884	97	30	29	4%	43%

7.16.38 Capacities of single carriageway roads depend upon their geometry but a value of 1600 vehicles per hour per lane is specified within the Department for Transport's DMRB Volume 13. The A446 is a dual carriageway road and capacity levels are up to 2100 per hour per lane. In this regard all the links assessed in the above table have forecasted traffic flows, including construction traffic, well within the link capacity for a single carriageway road.

Junction performance

7.16.39 Junctions within this area have been assessed for future baseline with construction traffic of the Proposed Scheme. One of the four assessed junctions will operate within capacity, when adding construction traffic to the 2021 future baseline scenario. The results at the junctions which are predicted to have a flow/capacity value over 85% are presented in Table 7-194 to Table 7-268.

Table 7-266: Roundabout A446 Lichfield Road/Faraday Avenue/Marsh Lane - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A446 North Bound (Lichfield Road)	1730	70%	2	2039	89%	7
Faraday Avenue	403	20%	1	705	38%	1
A446 South Bound (Lichfield Road)	1152	45%	1	1549	61%	2
Marsh Lane	260	31%	1	270	42%	1
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A446 North Bound (Lichfield Road)	878	33%	1	957	38%	1
Faraday Avenue	851	34%	1	1165	47%	1
A446 South Bound (Lichfield Road)	1385	58%	1	1843	78%	4
Marsh Lane	94	15%	0	111	29%	0

7.16.40 The modelling results demonstrate that the Proposed Scheme has a minimal impact on the capacity of the A446 Lichfield Road/Faraday Avenue/Marsh Lane junction.

Table 7-267: Signalised Roundabout A446 Lichfield Road/A4097 Kingsbury Road/M42 - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
M42 (N)	481	44%	8	536	50%	8
A4097 (Kingsbury Road) (E)	643	58%	10	716	65%	12
A446 (Lichfield Road) (S)	752	82%	14	834	91%	18
M42 (S)	1246	71%	20	1388	73%	22
A4097 (Kingsbury Road) (W)	674	73%	12	750	82%	14
A446 (Lichfield Road) (N)	1339	75%	21	1492	84%	25
17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
M42 (N)	293	27%	4	328	30%	5
A4097 (Kingsbury Road)(E)	350	32%	5	393	36%	6

A446 (Lichfield Road)(S)	1343	88%	24	1506	92%	29
M42 (S)	2011	87%	35	2254	92%	41
A4097 (Kingsbury Road)(W)	684	74%	12	768	83%	14
A446 (Lichfield Road)(N)	771	74%	13	864	83%	16

- 7.16.41 The modelling results demonstrate that the A446 Lichfield Road/A4097 Kingsbury Road/M42 junction operates over practical capacity on a number of arms in the peak hours in the 2021 baseline. Construction traffic will increase queues and delays at this junction but overall impacts are minimal.

Table 7-268: Roundabout A4091 Tamworth Road/A446 Lichfield Road - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A4091	642	59%	1	682	65%	2
A446 Lichfield Road South (NB)	1278	69%	2	1489	80%	4
M6 Toll	135	11%	0	135	13%	0
A446 Lichfield Road North (SB)	1244	81%	4	1327	90%	8
17:00-18:00	2021 Baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A4091	321	24%	0	384	29%	0
A446 Lichfield Road South (NB)	1687	89%	8	1759	93%	11
M6 Toll	51	5%	0	51	6%	0
A446 Lichfield Road North (SB)	915	62%	2	1001	68%	2

- 7.16.42 The modelling results demonstrate that the A4091 Tamworth Road/A446 Lichfield Road junction operates beyond its practical capacity on one arm in the PM peak hour and close to practical capacity in the AM peak hour in the 2021 baseline scenario. Construction traffic will increase queues and delays at this junction but the overall impact on congestion levels is not substantial.
- 7.16.43 Overnight and/or weekend road closures will be required to tie-in new highway realignments to the existing highways. These temporary closures will occur on the following highways:
- Faraday Avenue, between A446 Lichfield Road and Edison Road;
 - A4097 Kingsbury Road, between the M42 and Blackgraves Lane;
 - Bodymoor Heath Lane, between the A4091 Tamworth Road and the village of

Bodymoor Heath;

- A4091 Tamworth Road, between Brick Kiln Lane and Church Lane;
- Crowberry Lane, between Park Lane and Church Lane;
- Park Lane, between Wishaw Lane and the A4091 Tamworth Road; and
- Church Lane, between Crowberry Lane and the A4091 Tamworth Road.

7.16.44 These off peak closures will not have a substantial impact on road users.

7.16.45 Highway realignments in this area will result in changes in journey length. These changes will be permanent and are reported later in the Proposed Scheme operation section..

Accidents and safety

7.16.46 Accidents are concentrated at the junctions along A446 particularly at the junctions with Faraday Avenue and the A4097. However, construction traffic is not expected to affect accident rates.

Rail

7.16.47 Civil engineering works to construct the Curdworth viaducts over the Birmingham and Derby Line will necessitate temporary rail possessions affecting rail users passing through the Curdworth to Middleton area. Track possessions will be limited to a small number of weekend and 24 hour possessions. Additional rail possessions will be needed to accommodate the interface with Network Rail associated with the Kingsbury Road railhead to be used for systems works. These will similarly involve limited possessions including mid-week night time and weekend possessions. The impact of these works on rail passengers will not be substantial. Rail replacement services will be provided, if necessary, when rail possessions are in place.

7.16.48 The Birmingham and Derby Line will be used to supply materials to the Kingsbury Road railhead. These train movements will use available train paths and will have no impact on existing services.

Local bus and coach

7.16.49 It is not expected that the construction of the Proposed Scheme will require bus route diversions, as road closures are proposed overnight, when bus services will not be operational

Pedestrians, cyclists and equestrians

7.16.50 The main issues anticipated to arise as a result of the construction of the Proposed Scheme, on pedestrians, cyclist or equestrians, within the Curdworth to Middleton area will be temporary diversions of PRow.

- 7.16.51 A total of 10 PRoW will be permanently realigned in this area and are discussed in the operations section. Two of the 10 affected PRoW will be temporarily diverted during the construction phase of the Proposed Scheme. Table 7-269 lists the PRoW subject to a temporary diversion, its diversion length and increase in journey time.

Table 7-269: PRoW diversion (CFA22)

PRoW	Chainage	Diversion Length	Journey time increase
T15	172+080	100m	Just over 1min
M23a	168+250	100m	Just over 1min

- 7.16.52 The above diversion will be of a very minor length and affect low numbers of users (less than 30 users per day). Therefore it is considered that this change will not adversely impact upon pedestrians, cyclist or equestrians.
- 7.16.53 Note that impacts arising from permanent PRoW realignments are reported in the operations section below.

Waterways and canals

- 7.16.54 The impacts of construction of the permanent works over the Birmingham and Fazeley canal will not be substantial, as any stoppage of the waterway, if required, would only be overnight.

Curdworth and Middleton (CFA20) Proposed Scheme operation description

Operation trip assumptions

Trip generation

- 7.16.55 During the operational phase of the Proposed Scheme only occasional trips will have to be made for maintenance purposes. These infrequent vehicle movements will be very low and will have no material impact on the operation of any junctions or highways within the study area.

Avoidance and mitigation measures

- 7.16.56 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads crossing the Proposed Scheme in, or very close to their current location, resulting in no substantial diversions of traffic onto alternative routes; and
 - retaining PRoW crossing the Proposed Scheme, with any realignments kept to a minimum where reasonably practicable.

Curdworth and Middleton (CFA20) operation impacts

Key operation transport issues

- 7.16.57 This section considers the key transport issues during operations including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.
- 7.16.58 As previously set out, within the Curdworth to Middleton area, there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore not considered further in this section.
- 7.16.59 This section considers the impacts on traffic and transport and the consequential impacts resulting from the operational phase of the Proposed Scheme.

Strategic and local road network traffic flows

- 7.16.60 There will be no impact on the M6 Toll Road and M42 strategic roads resulting from the operational phase of the Proposed Scheme.
- 7.16.61 A total of five roads will be realigned within this area. Table 7-270 illustrates the change in length of each highway. Negative values demonstrate a shortening of the highway compared to its original alignment.

Table 7-270: Curdworth and Middleton highway realignments (CFA16)

Highway	Change in Length
A4097 Kingsbury Road	-10m
Bodymoor Heath Lane	660m
A4091 Tamworth Road	40m
Park Lane	-90m
Crowberry Lane	-5m

- 7.16.62 The maximum increase in journey length of 660m equates to a journey time of approximately 8 minutes for pedestrians and significantly less for motorised traffic. This level of change will not substantially impact on transport users within this area except for pedestrians using Crowberry Lane.
- 7.16.63 Overall, average travel times and journey time delays for vehicles through the area will also be similar to those forecasted without the Proposed Scheme in both 2026 and 2041.

Accidents and safety

- 7.16.64 The operational phase of the Proposed Scheme is not expected to have any substantial impact on accidents and safety within this area.

Rail

- 7.16.65 During the operational phase no local or national rail services will be impacted by the Proposed Scheme.

Local bus and coach

- 7.16.66 The Proposed Scheme will have no substantial impact on bus services which will cross the alignment of the Proposed Scheme. Bus services using Faraday Avenue will be subject to a 340m increase in journey length. Changes of this magnitude will not materially affect overall journey times or delays for public transport users.
- 7.16.67 Bus services using the A4097 Kingsbury Road and Bodymoor Heath Lane will experience minimal decrease in journey lengths, resulting in no substantial impact on journey times.

Pedestrians, cyclists and equestrians

- 7.16.68 A total of 10 PRoW will be realigned in this area. Of these, three PRoW (T15, 170+360; T179, 168+400 and M13, 167+350) will be realigned by less than 100m and thus will have no substantial affect on pedestrians, cyclists and equestrians.
- 7.16.69 The Proposed Scheme will have a beneficial impact on M22, which will be shortened by approximately 115m, resulting in a journey time reduction of approximately 1.5 minutes.
- 7.16.70 The Proposed Scheme will have a small impact on four PRoW (M16, 166+260; M14, M23, and M23a, 168+250). The maximum realignment of those will be approximately 320m, which will result in a maximum journey time increase of 4 minutes. Therefore it is considered that these changes will not substantially adversely impact existing pedestrians, cyclist or equestrians.
- 7.16.71 The maximum realignments of PRoW in this area will be approximately 835m and 2.5km (T17, 170+360 and M450, 167+480, respectively). Non-motorised users of these PRoW will be subject to journey time increases of 10 and 31 minutes respectively.

Waterways and canals

- 7.16.72 The operational phase of the Proposed Scheme will have no impact on the Birmingham and Fazeley canal.

7.17 Drayton Bassett, Hints and Weeford (CFA21)

Drayton Bassett, Hints and Weeford (CFA21) Proposed Scheme description

- 7.17.2 The Drayton Bassett, Hints and Weeford area covers an approximately 9.1km section of the Proposed Scheme in the District of Lichfield, Staffordshire, where it passes through the countryside between Sutton Coldfield and Tamworth. The City of Lichfield is situated to the north-west of the area. The area follows the route from the boundary between Warwickshire and Staffordshire in the south to its crossing of the A51 Tamworth Road at Whittington Heath in the north, and includes land within the parishes of Drayton Bassett, Hints, Canwell, Weeford, and Swinfen and Packington.
- 7.17.3 The area sits between the neighbouring areas of Curdworth to Middleton (CFA20) to the south and Whittington to Handsacre (CFA22) to the north.

Drayton Bassett, Hints and Weeford (CFA21) assessment methodology

- 7.17.4 Within the Drayton Bassett, Hints and Weeford area there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flows are therefore focussed on the construction stage

Drayton Bassett, Hints and Weeford (CFA21) future baseline

Key future baseline issues

- 7.17.5 The key issue in relation to the future baseline in the Drayton Bassett, Hints and Weeford area is the change in highway network flows due to background traffic growth. Some junctions are predicted to be operating over capacity in the future baseline scenario. For assessment purposes it has been assumed that there are no material changes to the highway or public transport networks in the future baseline. It is further assumed that there are no material changes to non-motorised traffic flows.

Land use assumptions

- 7.17.6 Future developments and land use changes are accounted for within the TEMPRO growth calculations. There are no substantial committed developments in proximity to the Proposed Scheme which are considered to require specific adjustment to the TEMPRO forecasts.

Transport supply assumptions

- 7.17.7 No material changes in transport supply are anticipated. It has been assumed that bus and rail services, along with PRoW usage, for future years of assessment will be the same as those currently operating. It is also assumed that no public transport or highway network improvements will be undertaken in the future baseline.

Traffic growth assumptions

- 7.17.8 The 2012/2013 baseline traffic flows of the 6 junctions, as described in the baseline conditions section for the Drayton Bassett, Hints and Weeford area have been uplifted to establish the future baseline conditions for 2021 by applying TEMPRO Growth Rates to existing traffic flows.
- 7.17.9 The TEMPRO Growth rates applied in this area can be found in Table 7-271 and Table 7-272.

Table 7-271: Drayton Bassett, Hints and Weeford TEMPRO growth rates for 2012

Authority	Location	Zone	2012-2021	
			Average Weekday Peaks	
			AM	PM
Staffordshire	Lichfield	Rural	1.11	1.12
Staffordshire	Lichfield	Fazeley (main)	1.1	1.01

Table 7-272: Drayton Bassett, Hints and Weeford TEMPRO growth rates for 2013

Authority	Location	Zone	2013-2021	
			Average Weekday Peaks	
			AM	PM
Staffordshire	Lichfield	Rural	1.10	1.11
Staffordshire	Lichfield	Fazeley (main)	1.09	1.1

- 7.17.10 The factors have been derived for the individual road types and relevant wards. The assessment covers the AM and PM peak periods for an average weekday.

Strategic and local road network traffic flows

- 7.17.11 The directional future baseline traffic flows for the strategic roads in this area which are likely to be affected by traffic changes as a result of the construction of the Proposed Scheme are contained within Table 7-273 and Table 7-274.

Table 7-273: Drayton Bassett, Hints and Weeford strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A38, Between A38/M6 Toll junction and A453	WB	1035	123	1149	137	114	11%
	EB	1823	207	2024	230	201	11%
A5 Between A38/M6 Toll junction and A453.	WB	1055	15%	1171	15%	116	11%
	EB	1210	15%	1343	15%	133	11%

Table 7-274: Drayton Bassett, Hints and Weeford strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A38, Between A38/M6 Toll junction and A453	WB	1735	138	1936	154	201	12%
	EB	1154	97	1288	108	134	12%
A5 Between A38/M6 Toll junction and A453	WB	1238	8%	1381	8%	143	12%
	EB	1042	11%	1163	11%	121	12%

7.17.12 The directional future baseline flows for local roads in the area which are likely to be affected by traffic changes as a result of the construction of the Proposed Scheme are contained within Table 7-275 and Table 7-276.

Table 7-275: Drayton Bassett, Hints and Weeford local road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A453 between A38/A446 junction and A5	NB	708	6%	786	6%	78	11%
	SB	779	8%	865	8%	86	11%
A453 between A5 and Watling Street/Jints Road junction	NB	951	3%	1056	3%	105	11%
	SB	822	4%	913	4%	91	11%

Table 7-276: Drayton Bassett, Hints and Weeford local road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A453 between A38/A446 junction and A5	NB	882	4%	984	4%	102	12%
	SB	823	4%	918	4%	95	12%
A453 between A5 and Watling Street/Jints Road junction	NB	1070	2%	1194	2%	124	12%
	SB	1016	1%	1134	1%	118	12%

7.17.13 In addition to the links described in the tables above, the following will also be affected by the construction of the Proposed Scheme as a result of traffic flow increased due to construction and mass haul movements. These links are as follows:

- Drayton Lane south of A453 to Shirral Drive;
- Bangley Lane north of A453;
- Watling Street north of A453; and
- Flats Lane east of Watling Street.

7.17.14 Junctions within the Drayton Bassett, Hints and Weeford area which have been identified as having potential to be impacted by additional traffic as generated by the construction movements of the proposed scheme are as follows:

- A453 Sutton Road/Drayton Lane;
- A38 London Road/A5/Watling Street/M6 Toll slip roads;
- A38 London Road/A453 Tamworth Road/A446 London Road;
- A38 London Road/A5148/A5206 London Road;
- A5127 Birmingham Road / A4148/A5 (North); and
- A5127 Birmingham Road / A4148/A5 (South).
- A453/Bangley Lane;
- A453/A5,
- A453 / B5404 Watling Street
- B5404/A5 on slip ; and
- B5404/Flats Lane

- 7.17.15 Existing traffic flows, through the junctions have been uplifted to establish their future baseline flows to compare with capacities. Table 7-277 to Table 7-279 show the junctions which will operate with flow/capacity values over 85% on one arm or more in the future baseline scenario. The 85% ratio is considered to be the threshold above which the junction is approaching its practical traffic capacity. It should be noted that once the junction reaches capacity (100%), then the predicted queue lengths become less reliable as the modelling software is approaching the limits of its operating range. In essence of the 6 junctions listed above 3 operate within capacity.

Table 7-277: Drayton Bassett, Hints and Weeford future baseline performance at the A38 London Road/A453 Tamworth Road/A446 London Road roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A38 (N)	1823	14%	0	2030	15%	0
A453 (NE)	685	87%	14	762	86%	15
A446	577	74%	10	522	73%	11
A38 (S)	576	74%	11	641	74%	12
A453 (SW)	627	54%	14	697	60%	16
17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A38 (N)	1154	25%	0	1293	28%	0
A453 (NE)	553	70%	10	620	78%	11
A446	893	88%	23	1000	92%	28
A38 (S)	1277	86%	15	1430	87%	17
A453 (SW)	779	84%	20	870	82%	22

Table 7-278: Drayton Bassett, Hints and Weeford future baseline performance at the A38 London Road/A5148/A5206 London Road roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A5148 north	1679	116%	126.2	1847	130%	246
A38 London Road east	1753	84%	4.9	1928	92%	10
A5148 south	94	11%	0.1	103	13%	0
A5206 west	676	63%	1.7	745	73%	3

17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A5148 north	1349	86%	5.7	1489	96%	15
A38 London Road east	2450	119%	215.1	2704	130%	419
A5148 south	98	14%	0.2	108	15%	0
A5206 west	383	36%	0.6	423	40%	1

Table 7-279: Drayton Bassett, Hints and Weeford future baseline performance at the A5/A5127 Birmingham Road/A5148 (northern roundabout)

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A5127 Birmingham Road (N)	632	80%	3.8	702	102%	22
A5148 (exit only)	-	-	-	-	-	-
A5127 Birmingham Road (S)	2163	94%	12.7	2402	104%	66
A5	1792	83%	4.6	1990	93%	11

17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A5127 Birmingham Road (N)	596	59%	1.4	665	71%	2
A5148 (exit only)	-	-	-	-	-	-
A5127 Birmingham Road (S)	2348	102%	52	2620	114%	184
A5	1396	62%	1.6	1558	70%	2

Drayton Bassett, Hints and Weeford (CFA21) Proposed Scheme construction description

Construction activities

7.17.16 The major construction elements within the study area are as follows:

- Hints and Milditch Wood Embankments, and Drayton Lane , Hints and Swinfen Cuttings;
- Drayton Bassett Viaduct; and
- A5 Trunk Road (Weeford-Fazeley Improvement) Overbridge.

7.17.17 Details of the construction phasing are summarised in Figure 7-24.

Figure 7-24: Drayton Bassett, Hints and Weeford construction activity phasing

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters				2026 quarter			
	1	2	3	4	1	2	3	1	2	1	2	1	2	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
Advance works																																								
Advance works																																								
Civil engineering works																																								
A4097 Kingsbury Road overbridge main compound (CFA20)																																								
Trickley Coppice embankment																																								
Drayton Lane embankment																																								
Drayton Lane cutting																																								
Drayton Bassett viaduct satellite compound																																								
Drayton Bassett viaduct																																								
Drayton Lane overbridge satellite compound																																								
Drayton Lane overbridge																																								
A453 Sutton Road overbridge satellite compound																																								
A453 Sutton Road overbridge																																								
Bangley Lane accommodation overbridge																																								
Bangley Lane accommodation overbridge																																								
Hints Footpath 9 underpass satellite compound																																								

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters				2026 quarter			
	1	2	3	4	1	2	3	1	2	1	2	1	2	1	2	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Hints Footpath 9 underpass																																								
Cappers Lane main compound (CFA22)																																								
Hints embankment																																								
Hints cutting																																								
Milditch Wood embankment																																								
Swinfen cutting																																								
Swinfen Hall aqueduct																																								
Hints Footpath 14 green overbridge satellite compound																																								
Hints Footpath 14 green overbridge																																								
Brockhurst Lane underbridge satellite compound																																								
Brockhurst Lane underbridge																																								
Black Brook viaduct satellite compound																																								
Black Brook viaduct																																								
A5 trunk road overbridge (east) and (west) satellite compound																																								
Watling Street overbridge																																								
A5 trunk road overbridge																																								
Flats Lane overbridge satellite compound																																								
Flats Lane overbridge																																								
A51 Tamworth Road overbridge satellite compound																																								

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters				2026 quarter			
	1	2	3	4	1	2	3	1	2	1	2	1	2	1	2	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
A51 Tamworth Road overbridge																																								
Horsley Brook Farm green overbridge																																								
Rail infrastructure and systems works																																								
Rail installation works (from Kingsbury Road railhead)																																								
Drayton Lane auto-transformer station																																								
Flats Lane auto-transformer station																																								
A51 package substation (construction compound in CFA21)																																								
Commissioning																																								
Commissioning																																								

Compounds and construction sites

- 7.17.18 Within the Drayton Bassett, Hints and Weeford area a total of 15 satellite construction compounds will be situated along the alignment of the Proposed Scheme.
- 7.17.19 The forecast size of the construction workforce required for each construction compound has been estimated from the construction activities associated with the design elements assigned to each compound. The peak and average daily workforce for each compound is shown in Table 7-280. Compounds with no workforce numbers are accessed via other compounds; where numbers are given they include all workers utilising that compound.

Table 7-280: Drayton Bassett, Hints and Weeford assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		average	peak
Satellite	Drayton Bassett viaduct compound	25	25
Satellite	Drayton Lane overbridge compound	20	20
Satellite	Drayton Lane auto-transformer station	-	-
Satellite	A453 Sutton Road overbridge compound	25	30
Roadhead	A453 Sutton Road	10	10
Satellite	Bangley Lane (Hints Bridleway 20) accommodation overbridge compound	20	32
Satellite	Hints Footpath 9 underpass compound	-	-
Satellite	Hints Footpath 14 green overbridge compound	-	-
Satellite	Brockhurst Lane underbridge compound	20	30

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
Satellite	Black Brook viaduct compound	46	115
Roadhead	Watling Street	10	10
Satellite	A5 Trunk Road (Weeford-Fazeley Improvement) overbridge (east) compound	-	-
Satellite	A5 Trunk Road (Weeford-Fazeley Improvement) overbridge (west) compound	-	-
Satellite	Flats Lane overbridge compound	23	30
Satellite	Flats Lane auto-transformer station	-	-
Satellite	A51 Tamworth Road overbridge compound	23	30
Satellite	A51 Tamworth Road package substation	-	-

Construction trip assumptions

Trip generation

- 7.17.20 Construction vehicle movements required to construct the Proposed Scheme include the delivery of plant and materials, movement of excavated materials and site worker trips to and from construction compounds. Construction routes have been determined based on the best available highway corridors between compounds and the strategic highway network with the aim of minimising impacts on local roads where practicable.

7.17.21 The duration of when there will be busy transport activity at each site is shown in Table 7-281. Some compounds only have traffic movements to other locations within the construction area. This represents the periods when the construction traffic flows will be greater than 50% of the peak flows. Also shown is the estimated number of daily vehicle trips during the peak month of activity, the lower end of the range shows the average number of trips in the busy period and the upper end the peak month flows. The assessment scenario has assumed that the peak months of operation for each site occur at the same time, therefore the assessment is based on a worst case scenario.

Table 7-281: Drayton Bassett, Hints and Weeford typical vehicle trip generation for construction site compounds

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	Drayton Bassett viaduct compound	Drayton Lane to A453 Sutton Road	June 2018	2	22	45	30-45
Satellite	Drayton Lane overbridge compound	Drayton Lane to A453 Sutton Road	June 2018	1	8	35	30-40
Satellite	Drayton Lane auto-transformer station	Drayton Lane to A453 Sutton Road	October 2022	1	10	45-70	<5
Satellite	A453 Sutton Road overbridge compound	A453 Sutton Road	June 2018	3	14	35-50	40-60
Roadhead	A453 Sutton Road	Via A453 Sutton Road	February 2019	3	20	-	655-1105
Satellite	Bangley Lane (Hints Bridleway 20) accommodation overbridge compound	Track/haul route via A453 Sutton Road overbridge	-	-	-	Few external movements	
Satellite	Hints Footpath 9 underpass compound	Track/haul route via A453 Sutton Road overbridge	-	-	-	Few external movements	
Satellite	Hints Footpath 14 green overbridge compound	Haul route to Watling Street onto A5, A38 to west	-	-	-	Few external movements	
Satellite	Brockhurst Lane underbridge compound	Along haul road onto Watling Street onto A5, A38 to west	July 2018	3.5	10	40-50	65-85

Compound type	Location	Access to/from compound	Indicative start/set up date	Estimated duration of use (years)	Estimated duration with busy vehicle movements (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	Black Brook viaduct compound	Watling Street onto A5, A38 to west	July 2017	4.5	17	150-165	95-135
Roadhead	Watling Street	Watling Street	August 2019	3	17	-	970-1000
Satellite	A5 Trunk Road (Weeford-Fazeley Improvement) overbridge (east) compound	Watling Street onto A5, A38 to west	-	-	-	Few external movements	
Satellite	A5 Trunk Road (Weeford-Fazeley Improvement) overbridge (west) compound	Watling Street onto A5, A38 to west	-	-	-	Few external movements	
Satellite	Flats Lane overbridge compound	Flats Lane/Watling Street onto A5, A38	June 2018	1.5	9	45-50	30-45
Satellite	Flats Lane auto-transformer station	Flats Lane/Watling Street onto A5, A38	October 2022	1	10	45-70	<5
Satellite	A51 Tamworth Road overbridge compound	A51 Tamworth Road	June 2018	3.5	17	40-50	40-50
Satellite	A51 Tamworth Road package substation	A51 Tamworth Road	-	-	-	Few external movements	

7.17.22 The assessment also includes for in-combination impacts by taking into account traffic and transport impacts of works being undertaken in neighbouring CFA areas. Construction traffic flows of 400 cars/LGV and 1490 HGV per day inbound and 470 cars/LGV and 1480 HGV per day outbound via the A38 as generated from CFA22 (Whittington to Handsacre) and 100 cars/LGV and 300 HGV per day inbound and 90 cars/LGV and 300 HGV per day outbound via the A446 as generated from CFA20 (Curdworth to Middleton) in the adjacent CFAs have been included in the assessment for this area.

Construction lorry routes

7.17.23 Construction trips will mainly occur along the alignment of the Proposed Scheme, however the main construction routes through the area will be as follows:

- The M6 Toll Road;
- A38, between A453 junction and A5148 south of Lichfield;
- A453, from A38 to A5 at Mile Oak;
- A5, from Mile Oak to A5148 junction south west of Lichfield;
- Watling Street, from A453 to on slip to A5 and north of Flats Lane;
- Flats Lane, from Watling Street to Knox's Grave Lane;
- Bangley Lane, from the A453 for approximately 1.5km; and
- Drayton Lane, north of Shirral Drive.

7.17.24 The construction routes can be found in Map TR-03-121.

Traffic management, road closures and diversions

7.17.25 Traffic management schemes in this area will relate to the following roads:

- Brockhurst Lane will be closed for a duration of 12 months. The alternative route could be up to 11 kms but flows are very low. A temporary pedestrian link will be maintained to reduce the impact.
- There will be some lane restrictions on A5 but these are not expected to give rise to substantial delays.

7.17.26 Overnight and/or weekend closures will be required to tie-in new highway diversions of the Proposed Scheme with the existing highways. These temporary closures will occur on the following highways:

- Drayton Lane, between the A453 and approximately 460m south of Shirral Drive;
- A453 Sutton Road, between Bangley Lane west and east;
- Bangley Lane, from the A453 in the west for approximately 1.5km;
- A51 Tamworth Road south of Whittington Common Road;
- Watling Street, between A38 and approximately 720m south of Flats Lane; and
- Flats Lane, from Watling Street for approximately 760m.

PRoW closures and diversions

- 7.17.27 In this area no PRoW will be closed during the construction phase of the Proposed Scheme. However, two of the PRoW (Hints Footpath 9, 175+780 and Hints Footpath 14, 176+580) will be temporarily affected and users will be diverted during the construction period with increased walking distances.

Avoidance and mitigation

- 7.17.28 The following measures have been included as part of the engineering design of the Proposed Scheme in order to avoid or reduce impacts on transport users:
- construction materials and equipment will be transported along the haul road adjacent to the Proposed Scheme alignment where reasonably practicable to reduce lorry movements on the public highway;
 - the majority of roads crossing the Proposed Scheme will be kept open during construction;
 - the Proposed Scheme includes permanent realignments/diversions of 14 PRoW and temporary re-routeing as necessary to reduce loss of amenity;
 - road closures will be limited to overnight and/or weekends;
 - traffic management tools will be utilised on the A5 in order to avoid road closure;
 - heavy goods vehicle (HGV) routeing will be along the strategic road network and use designated routes for access as shown in Map TR-03-121 (Volume 5, Map Book, Traffic and Transport);
 - materials will be transported by rail where reasonably practicable to reduce the potential numbers of HGV trips that would otherwise be made on the highway network; and
 - provision of on-site accommodation and welfare facilities (provided in CFA22) to reduce daily travel by site workers.
- 7.17.29 The draft Code of Construction Practice (CoCP) (see Volume 5: Appendix CT-003-000) includes measures which seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

- 7.17.30 Where reasonably practicable, the number of private car trips to and from each site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an over-arching framework travel plan⁶ that will require travel plans to be used along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where practical, particularly in the urban context, this will encourage the use of sustainable modes of transport.
- 7.17.31 The measures in the CoCP will include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific traffic management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, footpaths and other PRow affected by the Proposed Scheme as necessary.
- 7.17.32 Specific measures will include:
- core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will therefore generally arrive before the morning peak hour and depart after the evening peak hour (although the assessment has assumed that 50% of workforce journeys to the construction sites take place within the morning and evening peak hours to reflect a reasonable worst case scenario) (draft CoCP, Section 5); and
 - excavated material will be reused wherever reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15).

Drayton Bassett, Hints and Weeford (CFA21) construction impacts

Key construction transport issues

- 7.17.33 This section considers the key transport issues during construction including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.

⁶ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

Strategic and local road network traffic flows

- 7.17.34 Construction of the Proposed Scheme is forecast to result in substantial increases in daily traffic flows on certain roads within the Drayton Bassett, Hints and Weeford area as a result of designated construction routes through the area. The impact on the strategic road is summarised in Table 7-282 and Table 7-283.

Table 7-282: Drayton Bassett, Hints and Weeford area construction traffic flows on strategic roads (vehicles) - AM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A38, Between A38/M6 Toll junction and A453	NB	1035	1149	1170	157	21	20	2%	15%
	SB	1823	2024	2091	249	67	19	3%	8%
A5 Between A38/M6 Toll junction and A453	NB	1055	1171	1240	240	69	69	6%	40%
	SB	1210	1343	1412	269	69	69	5%	35%

Table 7-283: Drayton Bassett, Hints and Weeford area construction traffic flows on strategic roads(vehicles) - PM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A38, Between A38/M6 Toll junction and A453	NB	1735	1936	1981	162	45	8	2%	5%
	SB	1154	1288	1295	115	7	7	1%	6%
A5 Between A38/M6 Toll junction and A453	NB	1238	1381	1450	185	69	69	5%	59%
	SB	1042	1163	1232	197	69	69	6%	54%

- 7.17.35 Capacities of dual carriageway roads depend upon their geometry but a value of up to 2100 per hour per lane is specified within the Department for Transport's DMRB Volume 13. In this regard all the links assessed in the above table have forecasted traffic flows, including construction traffic, within the link capacity for a dual carriageway road.
- 7.17.36 Construction of the Proposed Scheme is forecast to result in substantial increases in daily traffic flows on certain roads within the Drayton Bassett, Hints and Weeford area as a result of designated construction routes through the area. The links expected to experience an impact are summarised in Table 7-284 and Table 7-285.

Table 7-284: Drayton Bassett, Hints and Weeford area construction traffic flows on local roads(vehicles) - AM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A453 between A38/A446 junction and A5	NB	708	786	860	116	74	73	9%	169%
	SB	779	865	948	140	83	74	10%	113%
A453 between A5 and Watling Street/Jints Road junction	NB	951	1056	1125	97	69	69	7%	249%
	SB	822	913	913	39	0	0	0%	0%

Table 7-285: Drayton Bassett, Hints and Weeford area construction traffic flows on local roads (vehicles) - PM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A453 between A38/A446 junction and A5	NB	882	984	1063	113	79	69	8%	159%
	SB	823	918	989	102	71	69	8%	206%
A453 between A5 and Watling Street/Jints Road junction	NB	1070	1194	1263	98	69	69	6%	238%
	SB	1016	1134	1134	11	0	0	0%	0%

- 7.17.37 Capacities of single carriageway roads depend upon their geometry but a value of 1600 vehicles per hour per lane is specified within the Department for Transport's DMRB Volume 13. In this regard all the links assessed in the above table have forecasted traffic flows, including construction traffic, well within the link capacity for a single carriageway road.
- 7.17.38 In addition to the links identified above, the following roads will also be impacted by construction traffic as follows for the AM peak hour in 2021:
- Drayton Lane south of A453 to Shirral Drive with an additional 29 vehicle movements of which 11 are HGVs;
 - Bangley Lane/Waggoner's Lane north of A453 with an additional 24 vehicle movements of which 12 are HGVs;
 - Watling Street north of A453 to A5 on slip road with 69 additional HGV movements;
 - Watling Street north of Flats Lane with an additional 101 vehicle movements of which 84 are HGVs; and
 - Flats Lane east of Watling Street with an additional 17 vehicle movements of which 6 are HGVs.

Junction performance

7.17.39 Junctions within this area have been assessed for future baseline with construction traffic of the Proposed Scheme. Three of the six assessed junctions will operate within capacity, when adding construction traffic to the 2021 future baseline scenario. The results at the junctions which are predicted to have a flow/capacity value over 85% is presented in Table 7-286 to Table 7-288.

Table 7-286: Roundabout A38 London Road/A453 Tamworth Road/A446 London Road - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00		2021 Baseline			2021 With HS2 construction traffic		
Approach (from)		Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A38 (N)		2030	15%	0	2053	92%	18
A453 (NE)		762	86%	15	821	19%	0
A446		522	73%	11	669	73%	11
A38 (S)		641	74%	12	641	74%	12
A453 (SW)		697	60%	16	697	61%	16
17:00-18:00		2021 Baseline			2021 With HS2 construction traffic		
Approach (from)		Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A38 (N)		1293	28%	0	1313	87%	14
A453 (NE)		620	78%	11	684	29%	0
A446		1000	92%	28	1057	92%	28
A38 (S)		1430	87%	17	1430	87%	17
A453 (SW)		870	82%	22	870	83%	22

7.17.40 The modelling results demonstrate that the A38 London Road/A453 Tamworth Road/A446 London Road junction is operating at its practical traffic capacity during the peak hours in the 2021 baseline. The addition of traffic associated with the construction of the Proposed Scheme will slightly increase queus at the junction but the overall impact is minimal.

Table 7-287: Roundabout A38 London Road/A5148/A5206 - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A5148 north	1847	130%	246	2056	146%	370
A38 London Road east	1928	92%	10	2180	105%	70
A5148 south	103	13%	0	201	28%	0
A5206 west	745	73%	3	768	84%	5
17:00-18:00	2021 Baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A5148 north	1489	96%	15	2097	136%	307
A38 London Road east	2704	131%	419	3063	152%	682
A5148 south	108	16%	0	304	41%	1
A5206 west	423	40%	1	452	47%	1

- 7.17.41 The modelling results demonstrate that the A38 London Road/A5148/A5206 junction is predicted to be operating over capacity in the peak hours in the 2021 baseline scenario. Construction traffic will increase queues and delays at the junction although these are likely to be overstated due to the robust assumptions used in the analysis regarding traffic growth and peak hour trip generation. However, the impact on congestion from the Proposed Scheme is likely to be substantial at this junction.

Table 7-288: Roundabout A5/A5127 Birmingham Road/A5148 Exit only - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A5127 Birmingham Road (N)	702	102%	22	730	106%	30
A5148						
A5127 Birmingham Road (S)	2402	104%	66	2485	108%	103
A5	1990	93%	11	1990	77%	14

17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A5127 Birmingham Road (N)	665	71%	2	723	78%	3
A5148						
A5127 Birmingham Road (S)	2620	114%	184	2628	115%	189
A5	1558	70%	2	1558	70%	2

- 7.17.42 The modelling results demonstrate that the A5/A5127 Birmingham Road/A5148 Exit only junction is predicted to be operating over capacity in the peak hours in the 2021 baseline scenario. Construction traffic will increase queues and delays at the junction although these are likely to be overstated due to the robust assumptions used in the analysis regarding traffic growth and peak hour trip generation. However, the impact on congestion from the Proposed Scheme is likely to be substantial at this junction.
- 7.17.43 The junction of the A38 London Road/A5/Watling Street/M6 Toll slip roads and the A5127 Birmingham Road/A4148/A5 (South), will be affected by the Proposed Scheme but analysis has shown these junctions to operate with flow/capacity values below 85%.
- 7.17.44 In addition to the junctions identified above the following junctions will also be affected by construction/mass haul traffic within the study area:
- A453/Bangley Lane junction with up to 96 additional vehicular movements per hour in peak periods including 56 HGVs;
 - The A453/A5, A453 / B5404 Watling Street and B5404 /A5 on slip junctions with up to 69 additional HGV movements per hour in peak periods; and
 - B5404 / Flats Lane junction with up to 78 additional HGV movements per hour in peak periods.
- 7.17.45 This small quantum of construction traffic is not expected to lead to substantial impacts in terms of the capacity of the junction or congestion impacts.
- 7.17.46 Overnight and/or weekend closures will be required to tie-in new highway diversions of the Proposed Scheme with the existing highways. These temporary closures will occur on the following highways:
- Drayton Lane, between the A453 and approximately 460m south of Shirral Drive;
 - A453 Sutton Road, between Bangley Lane west and east;
 - Bangley Lane, from the A453 in the west for approximately 1.5km;

- Brockhurst Lane, west of the village of Hints;
- Watling Street, between A38 and approximately 720m south of Flats Lane; and
- Flats Lane, from Watling Street for approximately 760m.

7.17.47 These off peak closures will not have a substantial impact on road users.

7.17.48 Note that impacts arising from permanent highway realignments are reported in the operations section below.

Accidents and safety

7.17.49 No substantial accident clusters have been identified on routes used by construction traffic of the Proposed Scheme within the the Drayton Bassett, Hints and Weeford area; construction traffic is not expected to substantially affect accident rates..

Rail

7.17.50 There are no existing rail services within the area and therefore the Proposed Scheme during construction will have no impact upon passenger or freight services..

Local bus and coach

7.17.51 It is not expected that the construction of the Proposed Scheme will require bus route diversions, as road closures are proposed overnight, when bus services will not be operational.

Pedestrians, cyclists and equestrians

7.17.52 The main issues anticipated to arise as a result of the construction of the Proposed Scheme within the Drayton Bassett, Hints and Weeford area will be temporary diversions of PRow.

7.17.53 A total of 14 PRow will be permanently realigned in this area and are discussed in the operation section. Two of the PRow will be temporarily affected and users will be diverted during the construction period with increased walking distances. Table 7-289 lists the PRow subject to a temporary realignment, their diversion lengths and increase in journey times.

Table 7-289: Drayton Bassett, Hints and Weeford PRow diversion

PRow	Chainage	Diversion Length	Journey time increase
Hints 9	175+780	100m	1 min
Hints 14	176+580	100m	1 min

7.17.54 The above diversions will be of a minor length and affect low numbers of users (less than 10 users per day). Therefore it is considered that these changes will not adversely impact non-motorised users.

- 7.17.55 Note that impacts arising from permanent PRow realignments are reported in the operations section below.

Waterways and canals

- 7.17.56 There are no navigable waterways in the area.

Drayton Bassett, Hints and Weeford (CFA21) Proposed Scheme operation description

Operation trip assumptions

Trip Generation

- 7.17.57 During the operational phase of the Proposed Scheme only occasional trips will have to be made for maintenance purposes. These infrequent vehicle movements will be very low and will have no material impact on the operation of any junctions or highways within the Drayton Bassett, Hints and Weeford area.

Avoidance and mitigation measures

- 7.17.58 The following measure has been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads crossing the Proposed Scheme in, or very close to their current location, resulting in no substantial diversions of traffic onto alternative routes; and
 - retaining PRow crossing the Proposed Scheme, with any realignments kept to a minimum where reasonably practicable.

Drayton Bassett, Hints and Weeford (CFA21) operation impacts

Key operation transport issues

- 7.17.59 This section considers the key transport issues during operations including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.
- 7.17.60 As previously set out, within the Drayton Bassett, Hints and Weeford area, there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore not considered further in this section.
- 7.17.61 This section considers the impacts on traffic and transport and the consequential impacts resulting from the operational phase of the Proposed Scheme.

Strategic and local road network traffic flows

- 7.17.62 There will be no impact on the A38 and A5 strategic roads within this area.

- 7.17.63 A total of four roads will be realigned within this area. Table 7-290 illustrates the change in length of each highway. Negative values demonstrate a shortening of the highway compared to its original alignment.

Table 7-290: Highway diversions (CFA21)

Highway	Diversion Length
Shirral Drive	-90m
Drayton Lane	40m
Flats Lane	30m
Knox's Grave Lane	-90m

- 7.17.64 The maximum increase in journey length of 40m equates to a journey time of approximately 30 seconds for pedestrians and significantly less for motorised traffic. This level of change will not substantially impact on transport users within this area.
- 7.17.65 Overall, average travel times and journey time delays for vehicles through the area will also be similar to those forecasted without the Proposed Scheme in both 2026 and 2041.

Accidents and safety

- 7.17.66 The impact on accidents and safety will be negligible as there are no locations where there are existing accident clusters or any material increase in traffic due to the operation of the Proposed Scheme.

Rail

- 7.17.67 There are no existing national or local rail services so there will be no impact from the Proposed Scheme.

Local bus and coach

- 7.17.68 The Proposed Scheme will have no impact on the one bus services, which will cross the alignment of the Proposed Scheme. This bus service is using the A453 Sutton Road which will experience no journey length change. Thus there will be no impact on this bus service.

Pedestrians, cyclists and equestrians

- 7.17.69 A total of 14 PRoW will be realigned/diverted within this area. Of these, five PRoW (Drayton Bassett 11, 174+500; Hints 20, 175+390; Hints 9, 175+780; Hints 13, 176+580; and Hints 14, 176+580) will be realigned by less than 100m. The impacts of those will not be substantial.

- 7.17.70 The Proposed Scheme will have a minor impact on nine PRoW (Drayton Basset 10, 174+100; Hints Footpath 8, 175+780; Hints Footpath 11, 177+400; Hints Footpath 19, 177+800; Hints 0.378, 177+800; Hints 4, 178+250; Swinfen and Packington Bridleways 5 and 7, 179+390; and Swinfen and Packington Bridleway 8, 180+850). The maximum realignment of a PRoW in this area will be approximately 280m (Hints 4). This PRoW was utilised by 47 users per day during surveys undertaken.
- 7.17.71 Therefore it is considered that these changes will not substantially adversely impact existing pedestrians, cyclist or equestrians.

Waterways and canals

- 7.17.72 There are no canals in this area so the Proposed Scheme will have no impact.

7.18 Whittington to Handsacre (CFA22)

Whittington to Handsacre (CFA22) Proposed Scheme description

- 7.18.1 The Whittington to Handsacre area covers approximately 11.5km of the Proposed Scheme in the district of Lichfield in Staffordshire, where it passes approximately 1km to the east of Lichfield to connect with the West Coast Main Line (WCML) at Handsacre. The area extends from the parish of Whittington in the south, near DMS Whittington (Whittington Barracks), through Streethay, Fradley and Kings Bromley, to its northern boundary at Handsacre. The area includes all or part of the parishes of Whittington, Lichfield, Fradley and Streethay, Curborough and Elmhurst, Kings Bromley, Longdon, and Armitage with Handsacre.
- 7.18.2 The area is the northerly section of the Proposed Scheme (see Volume 4 for 'off-route' works on the WCML). The northern extent includes the WCML between A515 Lichfield Road and B5013 Lichfield Road in Handsacre and, consequently, modifications to the WCML railway in this area. The southern boundary is defined as the A51 Tamworth Road at Whittington Heath. Drayton Bassett, Hints and Weeford (CFA 21) lies to the south.

Whittington to Handsacre (CFA22) assessment methodology

- 7.18.3 Within the Whittington to Handsacre area, there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore focussed on the construction stage.

Whittington to Handsacre (CFA22) future baseline

Key future baseline issues

- 7.18.4 The key issue in relation to the future baseline in the Whittington to Handsacre area is the change in highway network flows due to background traffic growth and some junctions are predicted to be operating over capacity in the future baseline scenario. For assessment purposes it has been assumed that there are no material changes to the highway or public transport networks in the future baseline. It is further assumed that there are no material changes to non-motorised traffic flows.

Future baseline assumptions

- 7.18.5 Future developments and land use changes are accounted for within the TEMPRO growth calculations. There are no substantial committed developments in proximity to the Proposed Scheme which are considered to require specific adjustment to the TEMPRO forecasts.

- 7.18.6 No material changes in transport supply are anticipated. It has been assumed that bus and rail services, along with PRow usage, for future years of assessment will be the same as those currently operating. It is also assumed that no public transport or highway network improvements will be undertaken in the future baseline.
- 7.18.7 The 2012/2013 baseline traffic flows of the 11 junctions, as described in the baseline conditions section for the Whittington to Handsacre area have been uplifted to establish the future baseline conditions for 2021 by applying TEMPRO Growth Rates to existing traffic volumes.
- 7.18.8 The TEMPRO Growth rates applied in this area can be found in Table 7-291 and Table 7-292.

Table 7-291: Whittington to Handsacre (CFA22) TEMPRO growth rates for 2012

Authority	Location	Zone	2012-2021	
			Average Weekday Peaks	
			AM	PM
Staffordshire	Lichfield	Rural	1.11	1.12
Staffordshire	Lichfield	Lichfield	1.10	1.10

Table 7-292: Whittington to Handsacre (CFA22) TEMPRO growth rates for 2013

Authority	Location	Zone	2013-2021	
			Average Weekday Peaks	
			AM	PM
Staffordshire	Lichfield	Rural	1.1	1.11
Staffordshire	Lichfield	Lichfield	1.1	1.1

- 7.18.9 The factors have been derived for the individual road types and relevant wards. The assessment covers the AM and PM peak periods for an average weekday.

Strategic and local road network traffic flows

- 7.18.10 The directional future baseline traffic flows for the strategic roads in this area which are likely to be affected by traffic changes as a result of the construction of the Proposed Scheme are contained within Table 7-293 and Table 7-294.

Table 7-293: Whittington to Handsacre strategic road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A38, between its jnc with the A5206 and its jnc with the A5192	NB	1930	16%	2143	16%	213	11%
	SB	2017	17%	2239	17%	222	11%
A38, between its jnc with the A5192 and its jnc with Wood End Lane	NB	1739	17%	1913	17%	174	10%
	SB	1599	18%	1759	18%	160	10%

Table 7-294: Whittington and Handsacre strategic road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A38, between its jnc with the A5206 and its jnc with the A5192	NB	2076	11%	2316	11%	240	12%
	SB	2086	10%	2328	10%	242	12%
A38, between its jnc with the A5192 and its jnc with Wood End Lane	NB	1904	12%	2124	12%	220	12%
	SB	1789	11%	1996	11%	207	12%

7.18.11 The directional future baseline flows for local roads in the area which are likely to be affected by traffic changes as a result of the construction of the Proposed Scheme are contained within Table 7-295 and Table 7-296.

Table 7-295: Whittington to Handsacre local road network future baseline flows (vehicles) - AM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A5192 Cappers Lane, between its jnc with the A5127 and its jnc with the A38	NB	716	7%	788	7%	72	10%
	SB	743	7%	817	7%	74	10%

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A5127 Burton Road, between its jnc with the A5192 and its jnc with the A38	EB	495	8%	545	8%	50	10%
	WB	563	9%	619	9%	56	10%
Wood End Lane, between its jnc with the A515 and its jnc with the A38	EB	283	6%	314	6%	31	11%
	WB	154	18%	171	18%	17	11%
A515 Lichfield Road, between its jnc with the A51 and approximately 600m to the east of its jnc with Wood End Lane	NB	199	14%	221	14%	22	11%
	SB	309	7%	343	7%	34	11%

Table 7-296: Whittington and Handsacre local road network future baseline flows (vehicles) - PM peak

Location	Direction	Baseline flow				All vehicles actual change from 2012	All vehicles % change from 2012
		2012		2021		2021	2021
		All vehicles	HGV	All vehicles	HGV		
A5192 Cappers Lane, between its jnc with the A5127 and its jnc with the A38	NB	757	5%	836	5%	79	10%
	SB	662	3%	731	3%	69	10%
A5127 Burton Road, between its jnc with the A5192 and its jnc with the A38	EB	577	4%	637	4%	60	10%
	WB	458	4%	506	4%	48	10%
Wood End Lane, between its jnc with the A515 and its jnc with the A38	EB	126	15%	141	15%	15	12%
	WB	315	4%	351	4%	36	12%
A515 Lichfield Road, between its jnc with the A51 and approximately 600m to the east of its jnc with Wood End Lane	NB	270	6%	301	6%	31	12%
	SB	220	10%	245	10%	25	12%

7.18.12 In addition to the links described in the tables above, the following will also be affected by the construction of the Proposed Scheme as a result of traffic flow increased due to construction and mass haul movements. These links are as follows:

- Broad Lane north of Capper's Lane;
- A51 Tamworth Road Between Whittingham Common and Cricket Lane;
- Cricket Lane between A51 Tamworth Road and A5206 London Road; and
- A5206 London Road between Cricket Lane and A38.

7.18.13 The junctions within the Whittington to Handsacre area which have been identified as having potential to be impacted by additional traffic as generated by the construction movements of the proposed scheme are as follows:

- A51 Tamworth Road/Lichfield Road (Whittington);
- A51 Tamworth Road/Link road leading to Darnford Lane;
- A5192 Eastern Avenue/A5127 Trent Valley Road/Cappers Lane/Valley Lane;
- A38 slip roads/Cappers Lane (west);
- A38 slip roads/Cappers Lane (east);
- A515 Lichfield Road/B5014 Lichfield Road;
- A51 Stafford Road/A515 Lichfield Road;
- A51 Stafford Road/A5192 Eastern Avenue;
- A51 Birmingham Road/A5127 Birmingham Road/A461 Sainte Foy Avenue/The Friary;
- A51 The Friary/Friary Avenue/Friary Road; and
- A461 Falkland Road/A5127 Birmingham Road.

7.18.14 Existing traffic flows, through the junctions have been uplifted to establish their future baseline flows to compare with capacities. Table 7-297 shows the junction which will operate with a flow/capacity value over 85% more than one arm in the future baseline scenario. The 85% ratio is considered to be the threshold above which the junction is approaching its practical traffic capacity. It should be noted that once the junction reaches capacity (100%), then the predicted queue lengths become less reliable as the modelling software is approaching the limits of its operating range. In essence of the eleven junctions listed above 10 operate within capacity.

Table 7-297: Whittington to Handsacre area future baseline performance at the A5192 Eastern Avenue/A5127 Trent Valley Road/Cappers Lane/Valley Lane roundabout

08:00-09:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A5192 Eastern Avenue	804	77%	3	884	88%	6
A5127 Trent Valley Road (East)	734	77%	3	807	88%	7
A5192 Cappers Lane	813	86%	6	894	98%	18
A5217 Trent Valley Road (West)	495	73%	3	545	83%	5
Valley Lane	153	38%	1	168	47%	1
17:00-18:00	2012			2021		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A5192 Eastern Avenue	750	68%	2	828	77%	3
A5127 Trent Valley Road (East)	785	80%	4	867	93%	10
A5192 Cappers Lane	784	86%	6	866	100%	21
A5217 Trent Valley Road (West)	527	87%	6	582	103%	21
Valley Lane	103	33%	1	114	44%	1

Whittington to Handsacre (CFA22) Proposed Scheme construction description

Construction activities

- 7.18.15 The major construction elements within the study area are as follows:
- Fulfen Wood Rail and Streethay Viaducts, and Harvey's Rough Flyover;
 - Fulfen Wood North, Streethay, Ravenshaw Wood, Shaw Lane and Lilac Embankments; and
 - Wood End Lane underbridge and associated road realignment.
- 7.18.16 Details of the construction phasing are provided in Volume 2, Section 2 and summarised in Figure 7-25.

Figure 7-25: Whittington to Handsacre construction activity phasing

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Advance works																																				
Advance works																																				
Civil engineering works																																				
Cappers Lane main compound																																				
Whittington Heath embankment																																				
Fulfen Wood south embankment																																				
Fulfen Wood north embankment																																				
Lichfield Road underbridge satellite compound																																				
Lichfield Road underbridge																																				
Darnford Lane overbridge satellite compound																																				
Whittington Common cutting																																				
Darnford Lane overbridge																																				
Huddlesford embankment																																				
Cappers Lane viaduct (south) (north) (west) satellite compound																																				
Cappers Lane viaduct																																				
Broad Lane underbridge (south) satellite compound																																				
Broad Lane underbridge																																				
Fulfen Wood viaduct (south) (north) satellite compound																																				
Fulfen Wood viaduct																																				

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Broad Lane underbridge																																				
Streethay construction sidings																																				
Streethay construction sidings																																				
Streethay viaduct (south-east) (north-east) (south-west) (north-west) satellite compound																																				
Streethay viaduct																																				
Curborough flyover satellite compound																																				
Streethay embankment																																				
Wood End Lane underbridge																																				
Curborough flyover																																				
Curborough embankment																																				
Pyford Brook east embankment																																				
Pyford Brook viaducts																																				
Pyford Brook west embankment																																				
Trent & Mersey Canal east viaduct satellite compound (south-east) (north-east)																																				
Trent and Mersey Canal north viaduct (Manchester spur)																																				
Trent and Mersey Canal east viaducts																																				
Trent & Mersey Canal west viaduct satellite compound (south-west) and Trent & Mersey canal west viaduct satellite compound (north-west)																																				
Trent & Mersey Canal west viaducts																																				

Construction activity	2017 quarters				2018 quarters				2019 quarters				2020 quarters				2021 quarters				2022 quarters				2023 quarters				2024 quarters				2025 quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
A515 Lichfield Road underbridge main compound																																				
Streethay construction sidings																																				
A515 Lichfield Road underbridge																																				
Rail infrastructure and systems works																																				
Rail installation works (From Handsacre [A515] main compound)																																				
Lyntus ATS satellite compound																																				
Mare Brook package substation satellite compound																																				
Shaw Lane satellite compound																																				
Rail installation works (From Kingsbury Road railhead)																																				
Cappers Lane ATS satellite compound																																				
Commissioning																																				
Commissioning																																				

Compounds and construction sites

7.18.17 Within the Whittington to Handsacre area a total of two main and 23 satellite construction compounds will be situated along the alignment of the Proposed Scheme, in addition to these there will be two Road heads within this area, used as access points on to the highway network for the movement of excavated material.

7.18.18 The forecast size of the construction workforce required for each construction compound has been estimated from the construction activities associated with the design elements assigned to each compound. The peak and average daily workforce for each compound is shown in Table 7-298. Compounds with no workforce numbers are accessed via other compounds; where numbers are given they include all workers utilising that compound.

Table 7-298: Whittington to Handsacre assumed workforce at construction sites

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		average	peak
Satellite	Lichfield Road underbridge compound	14	20
Satellite	Darnford Lane overbridge compound	18	30
Satellite	Cappers Lane viaduct (south) compound	-	-
Satellite	Cappers Lane viaduct (north) compound	30	30
Satellite	Cappers Lane viaduct (west) compound	-	-
Satellite	Cappers Lane auto-transformer compound	-	-
Satellite	Broad Lane underbridge compound	-	-
Main	Cappers Lane main compound	91	150
Satellite	Fulfen Wood viaduct (south) compound	-	-
Satellite	Fulfen Wood viaduct (north) compound	-	-
Sidings	Streethay construction sidings	-	-
Satellite	Streethay viaduct (south-east) compound	-	-

Compound type	Location	Assumed daily workforce per site for duration of construction programme	
		average	peak
Satellite	Streethay viaduct (north-east) compound	-	-
Satellite	Streethay viaduct (south-west) compound	-	-
Satellite	Streethay viaduct (north-west) compound	30	30
Satellite	Mare Brook package substation compound	-	-
Road head	Nanscawen Road	10	10
Satellite	Curborough flyover compound	32	100
Road head	Wood End Lane	10	10
Satellite	Trent & Mersey Canal East viaduct (south-east) compound	-	-
Satellite	Lyntus auto-transformer station compound	-	-
Satellite	Trent & Mersey Canal east viaduct (north-east) compound	-	-
Satellite	Trent and Mersey Canal west viaduct (south-west) compound	30	30
Satellite	Trent & Mersey Canal east viaduct (north-west) compound	-	-
Main	A515 Lichfield Road main compound	91	150
Main	Handsacre (A515) rail systems main compound	-	-
Satellite	A515 Lichfield Road underbridge compound	-	-
Satellite	Harvey's Rough flyover compound	-	-
Satellite	Shaw Lane Rail systems compound	-	-

Construction trip assumptions

Trip generation

- 7.18.19 Construction vehicle movements required to construct the Proposed Scheme include the delivery of plant and materials, movement of excavated materials and site worker trips to and from construction compounds. Construction routes have been determined based on the best available highway corridors between compounds and the strategic highway network with the aim of minimising impacts on local roads where practicable.
- 7.18.20 The duration of when there will be busy transport activity at each site is shown in Table 7-299. Some compounds only have traffic movements to other locations within the construction area. The data represent the periods when the construction traffic flows will be greater than 50% of the peak flows. Also shown is the estimated number of daily vehicle trips during the peak month of activity, the lower end of the range shows the average number of trips in the busy period and the upper end the peak month flows. The assessment scenario has assumed that the peak months of operation for each site occur at the same time, therefore the assessment is based on a worst case scenario.

Table 7-299: Whittington to Handsacre typical vehicle trip generation for construction site compounds

Compound type	Location	Access to/from compound	Indicative start / set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movement (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	Lichfield Road underbridge compound	Lichfield Road / A51 / A5206 / A38	2018	1.5	4	30-35	35-40
Satellite	Darnford Lane overbridge compound	Track/haul route via Lichfield Road Underbridge Satellite Compound	2018	3	-	Few external movements	
Satellite	Cappers Lane viaduct (south) compound	Track/haul route via Cappers Lane Main Compound	2017	2	-	Few external movements	
Satellite	Cappers Lane viaduct (north) compound	Cappers Lane / A38	2017	2	23	50	25-35
Satellite	Cappers Lane viaduct (west) compound	Track/haul route via Cappers Lane Main Compound	2017	2	-	Few external movements	
Satellite	Cappers Lane auto-transformer compound	Cappers Lane / A38	2022	1	11	50-70	5

Compound type	Location	Access to/from compound	Indicative start / set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movement (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	Broad Lane underbridge compound	Track/haul route via Cappers Lane Main Compound	2018	2.5	-	Few external movements	
Main	Cappers Lane main compound	Cappers Lane / A38	2018	6	1	180-210	80-105
Satellite	Fulfen Wood viaduct (south) compound	Track/haul route via Cappers Lane Main Compound	2018	2.5	-	Few external movements	
Satellite	Fulfen Wood viaduct (north) compound	Track/haul route via Streethay Construction Sidings	2018	2.5	-	Few external movements	
Sidings	Streethay construction sidings	Broad Lane / Cappers Lane / A38	2018	5	5	Few external movements	1550
Satellite	Streethay viaduct (south-east) compound	Track/haul route via Cappers Lane Main Compound	2019	2	-	Few external movements	
Satellite	Streethay viaduct (north-east) compound	Track/haul route via Cappers Lane Main Compound	2019	2	-	Few external movements	
Satellite	Streethay viaduct (south-west) compound	Track/haul route via Cappers Lane Main Compound	2019	2	-	Few external movements	
Satellite	Streethay Viaduct (north-west) compound	A38	2019	2	21	50	35-45
Satellite	Mare Brook package substation compound	Nanscawen Road / Wood End Lane / A38	2022	<1	<1	Few external movements	
Road head	Nanscawen Road	Wood End Lane to A38	2018	3	36	Few external movements	250
Satellite	Curborough flyover compound	Wood End Lane to A38	2018	7	13	140-150	110-135
Roadhead	Wood End Lane Roadhead	Wood End Lane to A38	2019	3	36	Few external movements	1250

Compound type	Location	Access to/from compound	Indicative start / set up date	Estimated duration of use (Years)	Estimated duration with busy vehicle movement (months)	Average daily combined two-way vehicle trips during busy period and within peak month of activity	
						Cars/LGV	HGV
Satellite	Trent & Mersey canal east viaduct (south-east) compound	Track/haul route via Curborough Viaduct Satellite Compound	2018	1	-	Few external movements	
Satellite	Lyntus auto-transformer station compound	Wood End Lane to A38	2022	1	11	50-70	5
Satellite	Trent & Mersey canal east viaduct (north-east) compound	Track/haul route via Curborough Viaduct Satellite Compound	2018	1	-	Few external movements	
Satellite	Trent and Mersey canal west viaduct (south-west) compound	Wood End Lane to A38	2018	1	13	50	35
Satellite	Trent & Mersey canal east viaduct (north-west) compound	Track/haul route via Trent and Mersey Canal West Viaduct (South-West) Satellite Compound	2018	1	-	Few external movements	
Main	A515 Lichfield Road main compound	A515 Lichfield Road	2018	5	26	1180-220	70-100
Main	Handsacre (A515) rail systems main compound	A515 Lichfield Road	2021	6	25	120-125	10
Satellite	A515 Lichfield Road underbridge compound	Track/haul route via A515 Lichfield Road Main Compound	2018	1	-	Few external movements	
Satellite	Harvey's Rough flyover compound	Track/haul route via A515 Lichfield Road main compound	2018	5	-	Few external movements	
Satellite	Shaw Lane rail systems compound	Shaw Lane / B5014 Lichfield Road / A515 Lichfield Road	2021	2	25	75-90	5

7.18.21 Trip generation from the construction works being undertaken in neighbouring CFAs has also been included in this assessment. Construction traffic flows of 470 cars/LGV and 1480 HGV per day inbound and 400 cars/LGV and 1480 HGV outbound per day via the A38 London Road and A5127 Birmingham Road as generated by CFA 21 (Drayton Bassett, Hints and Weeford) have been included in the assessment for this area.

7.18.22 The main issues anticipated to arise during the construction phase of the Proposed Scheme will be increased traffic as a result of implementation of the Proposed Scheme, road realignments and consequential temporary road closures.

7.18.23 The construction impacts within this CFA will be:

- construction vehicle movements to/from the main compounds and satellite compounds;
- overnight closure of the Trent and Mersey/Coventry canals to enable safe construction works to take place;
- movement of material between road heads and construction sidings;
- road closures and associated overnight and/or weekend diversions; and
- narrow lane working on the A38.

Construction lorry routes

7.18.24 Construction trips will mainly occur along the alignment of the Proposed Scheme, however the main construction routes through the area will be as follows:

- A38, between its junction with the M6 Toll in the south-west and its junction with Wood End Lane in the north-east;
- Cappers Lane, between its junction with Trent Valley Road in the north and the farm access road approximately 520m east of the Broad Lane/Cappers Lane junction;
- A5127 Burton Road, between its junction with the A5192 Cappers Lane in the west and its junction with the A38 in the north-east;
- Wood End Lane, between its junction with Netherstowe Lane in the north-west and its junction with the A38 in the south-east; and
- A515 Lichfield Road, between its junction with the A51 Stafford Road in the south-west and its junction with Wood End Lane in the north-east.

7.18.25 The construction routes can be found in Map TR-03-122.

Traffic management, road closures and diversions

- 7.18.26 Overnight and/or weekend closures will be required to tie-in new highway diversions of the Proposed Scheme with the existing highways. These temporary closures will occur on the following highways:
- Lichfield Road (Whittington), between Marsh Lane and Darnford Lane;
 - Darnford Lane, between Marsh Lane and Lichfield Road (Whittington);
 - Cappers Lane, between Broad Lane and Darnford Lane;
 - Broad Lane, between Cappers Lane and Huddlesford Lane
 - A38 (further details on construction phasing can be found in paragraph 7.18.48);
 - A515 Lichfield Road, between Wood End Lane and Shaw Lane; and
 - Wood End Lane, between Wood End Farm and Nanseawen Road.
- 7.18.27 One highway, the A38, will also be subject to traffic management measures.
- 7.18.28 In addition, part of Shaw Lane will be permanently closed. Further details can be found in the Proposed Scheme operation section in paragraph 7.18.65.

PRow closures and diversions

- 7.18.29 In this area no PRoW will be closed during the construction phase of the Proposed Scheme, however one PRoW, Whittington 17 (181+300), will be subject to an approximately 8m diversion.

Avoidance and mitigation

- 7.18.30 The following measures have been included as part of the engineering design of the Proposed Scheme in order to avoid or reduce impacts on transport users:
- construction materials and equipment will be transported along the haul road adjacent to the Proposed Scheme alignment where reasonably practicable to reduce lorry movements on the public highway;
 - the majority of roads crossing the Proposed Scheme will be kept open during construction resulting in minimal diversions of traffic onto alternative routes;
 - the Proposed Scheme includes permanent realignments of PRoW and temporary re-routeing as necessary to reduce loss of amenity;
 - road closures will be limited to overnight and/or weekends;
 - HGV route along the strategic road network and use designated routes for access as shown in map TR-03-122 (volume 5, Map Book, Traffic and Transport);

- materials will be transported by rail, where practicable, to reduce the potential numbers of HGV trips that would otherwise be made on the highway network; and
- provision of on-site accommodation and welfare facilities to reduce daily travel by site workers.

7.18.31 The draft Code of Construction Practice (CoCP) (see Volume 5: Appendix CT-003-000) includes measures which seek to reduce the impacts of deliveries of construction materials and equipment, including reducing construction lorry trips during peak background traffic periods. The draft CoCP includes HGV management and control measures.

7.18.32 Where reasonably practicable, the number of private car trips to and from each site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing. This will be supported by an over-arching framework travel plan⁷ that will require travel plans to be used along with a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme. As part of this, a construction workforce travel plan will be put into operation with the aim of reducing workforce commuting by private car, especially sole occupancy car travel. Where practical, particularly in the urban context, this will encourage the use of sustainable modes of transport.

7.18.33 The measures in the CoCP will include clear controls on vehicle types, hours of site operation, and routes for heavy goods vehicles, to reduce the impact of road based construction traffic. In order to achieve this, generic and site specific traffic management measures will be implemented during the construction of the Proposed Scheme on or adjacent to public roads, footpaths and other PRow affected by the Proposed Scheme as necessary.

7.18.34 Specific measures will include:

- core site operating hours will be 08:00-18:00 on weekdays and 08:00-13:00 on Saturdays and site staff and workers will therefore generally arrive before the AM peak hour and depart after the PM peak hour (although the assessment has assumed that 50% of workforce journeys to the construction sites take place within the AM and PM peak hours to reflect a reasonable worst case scenario) (draft CoCP, Section 5); and
- excavated material will be reused wherever reasonably practicable along the alignment of the Proposed Scheme which will reduce the impacts of construction vehicles on the public highway (draft CoCP, Section 15).

⁷ Construction and operational travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

Whittington to Handsacre (CFA22) construction impacts

Key construction transport issues

- 7.18.35 This section considers the key transport issues during construction including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.

Strategic and local road network traffic flows

- 7.18.36 Construction of the Proposed Scheme is forecast to result in substantial increases in daily traffic flows on certain roads within the Whittington to Handsacre area as a result of designated construction routes through the area. The impacts on the strategic road is summarised in Table 7-300 and Table 7-301.

Table 7-300: Whittington to Handsacre area construction traffic flows on strategic road (vehicles) - AM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A38, between its jnc with the A5206 and its jnc with the A5192	NB	1930	2143	2304	614	374	278	17%	83%
	SB	2017	2239	2296	648	279	276	12%	74%
A38, between its jnc with the A5192 and its jnc with Wood End Lane...	NB	1739	1913	1909	461	170	138	9%	43%
	SB	1599	1759	1739	459	140	138	8%	43%

Table 7-301: Whittington to Handsacre area construction traffic flows on strategic road (vehicles) - PM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A38, between its jnc with the A5206 and its jnc with the A5192	NB	2076	2316	2340	529	264	263	11%	99%
	SB	2086	2328	2431	505	345	263	15%	109%
A38, between its jnc with the A5192 and its jnc with Wood End Lane...	NB	1904	2124	2035	392	131	131	6%	50%
	SB	1789	1996	1955	348	166	130	8%	60%

- 7.18.37 Capacities of dual carriageway roads depend upon their geometry but a value of up to 2100 per hour per lane is specified within the Department for Transport's DMRB Volume 13. In this regard all the links assessed in the above table have forecasted traffic flows, including construction traffic, within the link capacity for a dual carriageway road.

7.18.38 Construction of the Proposed Scheme is forecast to result in substantial increases in daily traffic flows on certain roads within the Whittington to Handsacre area as a result of designated construction routes through the area. The links expected be impacted are summarised in Table 7-302 and Table 7-303.

Table 7-302: Whittington to Handsacre area construction traffic flows on local roads (vehicles) - AM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A5192 Cappers Lane, between its jnc with the A5127 and its jnc with the A38	NB	716	788	814	70	26	17	3%	32%
	SB	743	817	833	74	16	16	2%	27%
A5127 Burton Road, between its jnc with the A5192 and its jnc with the A38	EB	495	545	571	61	26	17	5%	39%
	WB	563	619	635	69	16	16	3%	30%
Wood End Lane, between its jnc with the A515 and its jnc with the A38	EB	283	314	357	30	43	11	14%	58%
	WB	154	171	183	41	12	11	7%	37%
A515 Lichfield Road, between its jnc with the A51 and approximately 600m to the east of its jnc with Wood End Lane	NB	199	221	279	41	58	11	26%	37%
	SB	309	343	354	35	11	11	3%	45%

Table 7-303: Whittington to Handsacre area construction traffic flows on local roads (vehicles) - PM peak

Location	Direction	2012 baseline	2021 baseline	2021 With HS2 construction traffic		With HS2 actual change from 2021 baseline		With HS2 % change from 2021 baseline	
		All vehicles		All vehicles	HGV	All vehicles	HGV	All vehicle	HGV
A5192 Cappers Lane, between its jnc with the A5127 and its jnc with the A38	NB	757	836	852	55	16	16	2%	41%
	SB	662	731	747	35	16	16	2%	85%
A5127 Burton Road, between its jnc with the A5192 and its jnc with the A38	EB	577	637	653	44	16	16	3%	58%
	WB	458	506	522	35	16	16	3%	85%
Wood End Lane, between its jnc with the A515 and its jnc with the A38	EB	126	141	145	25	4	4	3%	19%
	WB	315	351	382	19	31	3	9%	19%

A515 Lichfield Road, between its jnc with the A51 and approximately 600m to the east of its jnc with Wood End Lane	NB	270	301	305	21	4	3	1%	17%
	SB	220	245	289	28	44	3	18%	12%

7.18.39 Capacities of single carriageway roads depend upon their geometry but a value of 1600 vehicles per hour per lane is specified within the Department for Transport's DMRB Volume 13. In this regard all the links assessed in the above table have forecasted traffic flows, including construction traffic, well within the link capacity for a single carriageway road.

7.18.40 In addition to the links identified above, the following roads will also be impacted by construction traffic as follows for the AM peak hour in 2021:

- Broad Lane north of Capper's Lane with 115 additional HGV movements ;
- A51 Tamworth Road Between Whittingham Common and Cricket Lane with an additional 50 vehicle movements of which 18 are HGVs ;
- Cricket Lane between A51 Tamworth Road and A5206 London Road with an additional 50 vehicle movements of which 21 are HGVs and
- A5206 London Road between Cricket Lane and A38 with an additional 50 vehicle movements of which 18 are HGVs

Junction performance

7.18.41 Junctions within this area have been assessed for future baseline with construction traffic of the Proposed Scheme. Junctions which will be operating at and over capacity when adding construction traffic to the 2021 future baseline scenario are summarised in Table 7-304 and Table 7-305. These junctions are predicted to have flow/capacity values over 85% on one arm or more.

Table 7-304: Roundabout A5192 Eastern Avenue/A5127 Trent Valley Road/Cappers Lane/Valley Lane - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
A5192 Eastern Avenue	884	88%	6	888	89%	7
A5127 Trent Valley Road (East)	807	88%	7	842	93%	9
A5192 Cappers Lane	894	98%	18	923	102%	25
A5127 Trent Valley Road (West)	545	83%	5	546	85%	5
Valley Lane	168	47%	1	168	50%	1

17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
A5192 Eastern Avenue	828	77%	3	832	78%	3
A5127 Trent Valley Road (East)	867	93%	10	902	96%	14
A5192 Cappers Lane	866	100%	21	903	104%	30
A5217 Trent Valley Road (West)	582	103%	21	582	104%	23
Valley Lane	114	44.2	1	116	45%	1

- 7.18.42 The modelling results demonstrate that the A5192 Eastern Avenue/A5127 Trent Valley Road/Cappers Lane/Valley Lane junction operates near or at theoretical capacity in the peak hours in the 2021 baseline scenario. Construction traffic will increase queues and delays at this junction but the overall impact on congestion levels is not substantial.

Table 7-305: Priority junction Cappers Lane East/A38 on Slip Road - 2021 future baseline without and with Proposed Scheme for AM and PM

08:00-09:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (All PCU)	Flow/ capacity %	Max queue	Flow (All PCU)	Flow/ capacity %	Max queue
Cappers Lane East	196	0%	0	505	0%	0
A38 On Slip Road	0	0%	0	0	0%	0
A5192 Cappers Lane West	549	75%	3	549	87%	7

17:00-18:00	2021 baseline			2021 With HS2 construction traffic		
Approach (from)	Flow (all PCU)	Flow/ capacity %	Max queue	Flow (all PCU)	Flow/ capacity %	Max queue
Cappers Lane East	118	0%	0	462	0%	0
A38 On Slip Road	0	0%	0	0	0%	0
A5192 Cappers Lane West	553	61%	2	553	72%	3

- 7.18.43 The modelling results demonstrate that the Proposed Scheme has a minimal impact on the capacity of the Cappers Lane East/A38 on Slip Road junction.

- 7.18.44 In addition to the junctions identified above there are three junctions affected by construction/Mass haul traffic within the study area including the following with AM peak hour 2021 flows:

- A38/ Wood End Lane junction with an additional 219 HGV movements;
- Wood End Lane/Nanscawen Road junction with an additional 156 HGV movements; and

- Cappers Lane/Broad Lane junction with an additional 193 HGV movements.

7.18.45 The increases in HGVs by the construction of the Proposed Scheme are substantial at all three locations but we would expect the junctions to operate satisfactorily in capacity terms.

7.18.46 Overnight and/or weekend closures will be required to tie-in new highway diversions of the Proposed Scheme with the existing highways. These temporary closures will occur on the following highways:

- Lichfield Road (Whittington), between Marsh Lane and Darnford Lane;
- Darnford Lane, between Marsh Lane and Lichfield Road (Whittington);
- Cappers Lane, between Broad Lane and Darnford Lane;
- Broad Lane, between Cappers Lane and Huddlesford Lane
- A38 (further details on construction phasing can be found in paragraph 7.18.48);
- A515 Lichfield Road, between Wood End Lane and Shaw Lane; and
- Wood End Lane, between Wood End Farm and Nanseawen Road.

These off peak closures will not have a substantial impact on road users.

7.18.48 Construction of the Streethay Viaduct over the A38 and its slip roads will be coordinated with the realignment of the A38 northbound slip road. The structure will be constructed using standard construction techniques. To maintain safe operation of the dual carriageway it will be necessary to undertake the works under traffic management, which will operate for a period of approximately six years on the A38 and its slip roads, and is likely to include temporary speed restrictions for safety and temporary use of the hard shoulder to provide adequate working space; reduced lane widths may also be used at times. To safely install the bridge decks over the carriageway it will be necessary to close the carriageway overnight during these works.

7.18.49 Highway realignments in this area will result in changes in journey length. These changes will be permanent and are reported later in Proposed Scheme operation

Accidents and safety

7.18.50 There is one road, the A38, where there are existing highway safety issues. However, the accidents are not located at one single location as these were scattered over a stretch of approximately 2.3km. The impact of construction traffic on accidents and safety within the study area is therefore expected to be minimal.

Rail

- 7.18.51 Rail possessions will be required to make the connection between the Proposed Scheme and the WCML. These possessions will be planned to help limit any disruptions to passenger and freight services and are described in Volume 2 Section 2.3. As the possessions will be for only limited duration, the impact on public transport delay is considered to be not substantial. The possessions required on the South Staffordshire Line are not expected to affect passenger services. The South Staffordshire line and the WCML will be used for the movement of bulk earthworks to and/or from Streethay construction sidings. These train movements will use available train paths and will have no impact on existing services.

Local bus and coach

- 7.18.52 It is not expected that the construction of the Proposed Scheme will require bus route diversions, as road closures are proposed overnight, when bus services will not be operational.

Pedestrians, cyclists and equestrians

- 7.18.53 The main issues anticipated to arise as a result of the construction of the Proposed Scheme, on pedestrians, cyclist or equestrians, within the Whittington to Handsacre area will be temporary diversions of PRoW.
- 7.18.54 A total of seven PRoW will be permanently realigned in this area and are discussed in the operations section. One of the seven affected PRoW will be temporarily diverted during the construction phase of the Proposed Scheme. Table 7-306 lists the PRoW subject to a temporary realignment, its diversion length and increase in journey time.

Table 7-306: Whittington to Handsacre PRoW diversion

PRoW	Chainage	Diversion Length
Whittington 17	181+300	8m

- 7.18.55 The above diversion will be of a very minor length and affect low numbers of users (during surveys undertaken no usage has been identified). Therefore it is considered that this change will not adversely impact upon pedestrians, cyclist or equestrians.
- 7.18.56 Note that impacts arising from permanent PRoW realignments are reported in the operation section below.

Waterways and canals

- 7.18.57 The impacts of construction of the permanent works over the Trent and Mersey canal and the construction of temporary works over the Coventry canal will not be substantial, as any stoppage of the waterway, if required, would only be overnight.

Whittington to Handsacre (CFA22) Proposed Scheme operation description

Operation trip assumptions

Trip generation

- 7.18.58 During the operational phase of the Proposed Scheme only occasional trips will have to be made for maintenance purposes. These infrequent vehicle movements will be very low and will have no material impact on the operation of any junctions or highways within the Whittington to Handsacre area.

Avoidance and mitigation measures

- 7.18.59 The following measures have been included as part of the design of the Proposed Scheme and will avoid or reduce impacts on transport users:
- retaining the majority of roads crossing the Proposed Scheme in, or very close to their current location, resulting in no substantial diversions of traffic onto alternative routes;
 - retaining PRoW crossing the Proposed Scheme, with any realignments kept to a minimum where reasonably practicable; and
 - modifications to the WCML to accommodate additional train movements.

Whittington to Handsacre (CFA22) operation impacts

Key operation transport issues

- 7.18.60 This section considers the key transport issues during operations including impacts upon the road network, on road safety, upon public transport users and non motorised users of the transport network.
- 7.18.61 As previously set out, within the Whittington to Handsacre area there is no material traffic generation resulting from the operation of the Proposed Scheme. Impacts associated with changes in traffic flow are therefore not considered further in this section.

Strategic and local road network traffic flows

- 7.18.62 There will be no substantial impact on the operation of the A38 as a result of the Proposed Scheme.
- 7.18.63 A total of five roads will be realigned within this area. Table 7-307 illustrates the change in length of each highway. Negative values indicate a reduction in length.

Table 7-307: Highway diversions (CFA22)

Highway	Change in Length
Darnford Lane	5m
Broad Lane	No change in length
A5127 Burton Road northbound slip road onto the A38	20m
Wood End Lane	220m
Netherstowe Lane	-165m

7.18.64 The maximum increase in journey length of 220m equates to a journey time of approximately 3 minutes for pedestrians and significantly less for motorised traffic. This level of change will not substantially impact on transport users within this area.

7.18.65 Part of Shaw Lane will be permanently closed, between the WCML bridge and the junction with Tuppenhurst Lane. The diversion of traffic from the east side of HS2, at Shaw Lane Farm, will be via the retained Shaw Lane to the A515 Lichfield Road and then B5014 Lichfield Road. The retained length of Shaw Lane will include passing places. The closure will cause increased journey times for road users, due to the 4.5km increase in distance, with a minor substantial impact. The length of Shaw Lane retained to the west of the WCML will become a short cul-de-sac.

7.18.66 Overall, average travel times and journey time delays for vehicles through the area will also be similar to those forecast without the Proposed Scheme in both 2026 and 2041.

Accidents and safety

7.18.67 There is one road, the A38, where a substantial amount of accidents occurred, but these were scattered over an approximate stretch of 2.3km with no specific safety concerns. In any case, no substantial increases in traffic due to the operation of the Proposed Scheme will take place and the impact on accidents and safety will be negligible.

Rail

7.18.68 There are no impacts on rail services in this area.

Local bus and coach

7.18.69 Bus services using Lichfield Road (Whittington) and the A38 will not be subject to any journey time changes as a result of the Proposed Scheme.

Pedestrians, cyclists and equestrians

- 7.18.70 Five of the seven affected PRow will be realigned within this area. Of these, three will be realigned by less than 100m, resulting in no substantial impact on PRow users.
- 7.18.71 The Proposed Scheme will impact on two PRow, Alrewas 31 (186+125) and Kings Bromley 0.392 (189+670). The maximum realignment of a PRow in this area will be approximately 490m (Kings Bromley 0.392). This PRow was utilised by no users during surveys undertaken.
- 7.18.72 Therefore it is considered that these changes will not substantially impact existing pedestrians, cyclist or equestrians.

Waterways and canals

- 7.18.73 The operation of the Proposed Scheme will have no impact on the canals within this area.